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The Imperial Council of Agricultural Research

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**LIFE-HISTORIES OF INDIAN MICROLEPIDOPTERA**

(Second Series.)

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**ALUCITIDAE (PTEROPHORIDAE),  
TORTRICINA AND GELECHIADAE**

BY

**T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.E.S., F.Z.S.,**

*Imperial Entomologist, Pusa.*



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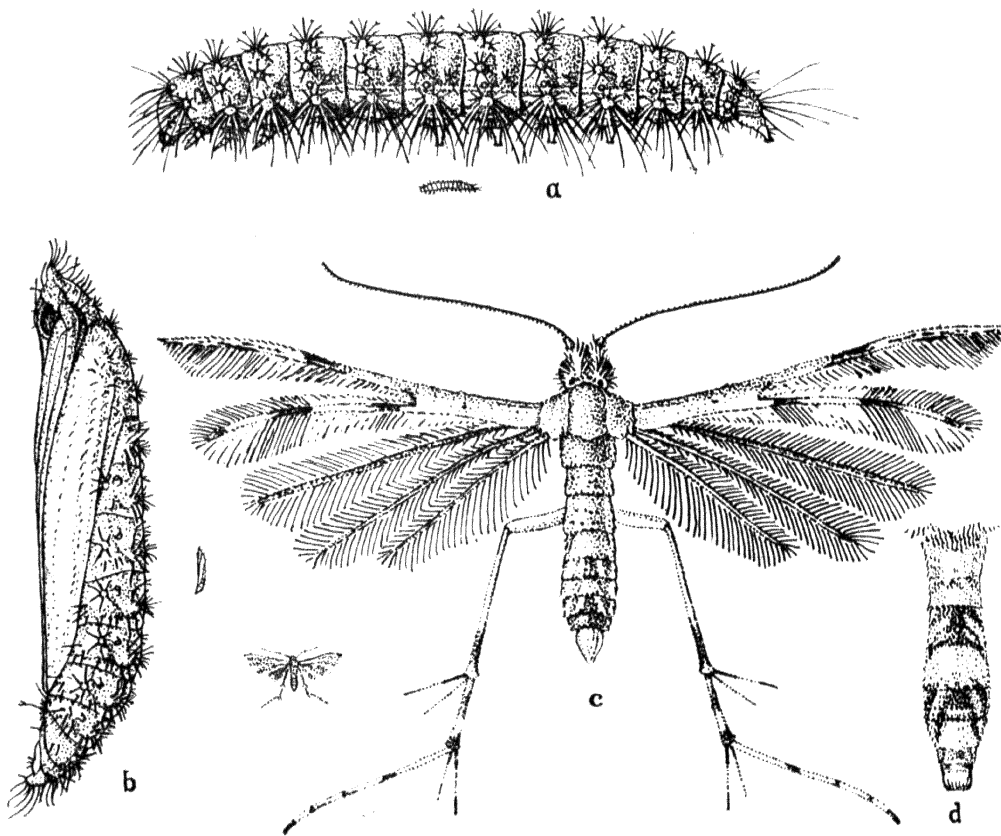
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PLATE I.

COSMOCLOSTIS PREMNICOLA, n. sp.



a Larva  $\times 12$ .

b Pupa  $\times 12$ .

c Moth  $\text{♂} \times 9$ .

d Abdomen of  $\text{♀}$  moth  $\times 9$ .

(Small figures show natural sizes.)

# LIFE-HISTORIES OF INDIAN MICROLEPIDOPTERA.

## Second Series.

### ALUCITIDÆ (PTEROPHORIDÆ), TORTRICINA AND GELECHIADÆ.

BY

T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.E.S., F.Z.S.,

*Imperial Entomologist, Pusa.*

(Received for publication on 18th September 1931.)

COSMOCLOSTIS AGLAODESMA, MEYR.

*Cosmoclostis aglaodesma*, Meyr., T.E.S. 1886. 12-13 (1886).

Originally described from Sydney, New South Wales, this species has since been found to occur in Queensland, the Solomon Islands, Ceylon, South India (Karnar) and Assam. Its life-history is still unknown but a specimen was reared at the Forest Research Institute, Dehra Dun, from a pupa attached to a teak-leaf which was sent from Assam with other Lepidopterous larvæ defoliating teak. This, however, is no evidence that the larva of *C. aglaodesma* feeds on *Tectona*, a food-plant which is unlikely in view of the distribution of this insect.

COSMOCLOSTIS PREMNICOLA, n. sp. (PLATE I).

♂ ♀. 12-14 mm. Head pale ochreous, paler or whitish between upper portion of eyes and white beneath, back of head with tuft of pale ochreous diverging hairs bifurcated apically. Antenna white, indistinctly ringed with pale ferruginous. Labial palpus short, filiform, drooping, white. Tongue well-developed. Thorax white, ochreous or fuscous-ferruginous posteriorly. Abdomen stout, whitish or whitish-yellow, in female the segments marked with white or whitish-yellow dorsal spots which form a posterior band on third segment and almost completely cover fifth, seventh and ninth segments, intermediate segments mostly suffused with fuscous-ferruginous on which the ground-colour shows in irregular spots and transverse subdorsal streaks; in the male the pattern is less pronounced but the anal tuft on ninth (last) segment is shining silvery-or yellowish-white. Legs white, incompletely banded with ferruginous; hind tibia with distinct dorsal tuft at origin of inner spurs; spurs long, white, broadly ferruginous basally and apically. Forewing narrow, cleft from about  $\frac{1}{3}$ , segments linear, white marked with ferruginous and blackish scales; costa irregularly suffused with ferruginous intermixed with darker scales; a few scattered ferruginous scales along dorsum before cleft; usually a patch of dark scales forming a small sub-costal spot at about  $\frac{1}{3}$ ; on first segment a dark dorsal dot at base, a transverse bar at  $\frac{1}{2}$ , irregular dots tending to form a

bar at  $\frac{3}{4}$  and a few scattered blackish scales beyond this ; second segment with a broad bar of scattered blackish scales at base, a strong broad black bar commencing from middle and a short black ante-apical spot : cilia ochreous-grey, darker opposite dark bands and lighter (about whitish) opposite white spaces. Hindwing cleft firstly from about  $\frac{1}{12}$ , secondly almost from base ; segments long and narrow ; whitish, with scattered ochreous-grey scales : cilia long, without scale-tufts, pale grey, darker on costa and at apex of second segment.

Pusa : eight specimens, bred in August and September 1930 from larvæ on *Premna latifolia* (C. S. 2534).

*Cosmoclostis premnicola* seems to be most closely allied to *C. pesselata*, Meyr., described from Puttalam (Ceylon), which has the abdomen in the male white irregularly marked with ferruginous and in the female pale yellow, the last three segments marked with ferruginous, and the palpi sprinkled with fuscous. It differs from *C. aglaodesma*, Meyr. by wanting the large silvery-white dorsal spots on abdomen ; from *C. auxileuca*, Meyr., described from the Khasi Hills, in its head not being white suffused with whitish-yellow, in details of the markings and in the non-ochreous cilia of forewing ; from *C. quadriquadra*, Wlsm., only known from Christmas Island, in the colour of the thorax, in the forewing not being yellowish-white and in the absence of the whitish basal quadrate patch on the abdomen. The larva feeds on leaves of *Premna latifolia*, either nibbling the green tissue of the upper side of the leaf, leaving the lower epidermis, or eating round or linear holes through both surfaces of the leaf, and deposits black pellets of frass on the leaves on which it has fed. It is about 7 mm. long, yellowish-green in colour, with rosettes of yellow hairs, of which the subspiracular hairs are much longer than the dorsal and supraspiracular ones, some of both the dorsal and lateral hairs being bifurcated apically ; the subspiracular tubercle is much larger than the others ; thoracic legs well-developed, glassy-white ; prolegs well-developed, long, glassy-white ; spiracles small, circular, clear-centred, margined brown, that on eighth abdominal segment considerably raised above body-surface.

Pupation takes place on the surface of a leaf on a thin mesh of silken threads in which the cremastral hooks are thrust. The pupa is about 6 mm. long by 1.3 mm. broad, leaf-green, thickly covered with groups of small yellow hairs ; the head-segment has two short protuberant tubercles, directed anteriorly and bearing numerous hairs ; the wing-cases and antenna-sheaths reach to the posterior margin of the sixth abdominal segment ; spiracles oval, whitish, slightly raised. The pupal period is about five days, in August.

#### DIACROTRICHA FASCIOLA, ZELLER (PLATE II).

The life-history was described briefly in *Ent. Mem.* VI, pp. 1-2, and has since been followed in more detail (see Plate II). The larva bores into unexpanded flowers of *Averrhoa carambola* or it may feed on the very young pinkish leaves which

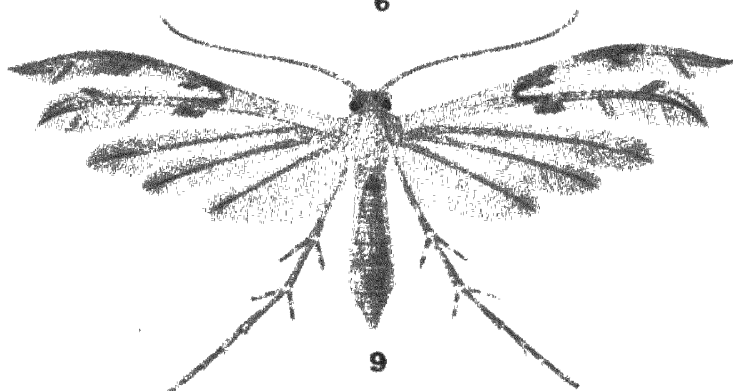
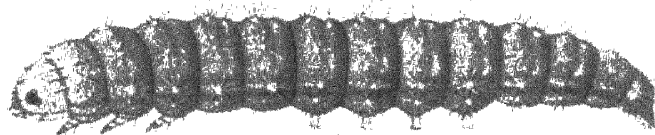
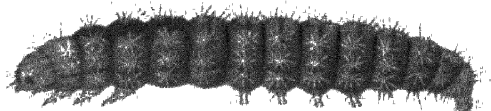
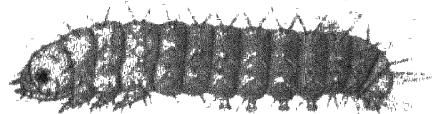
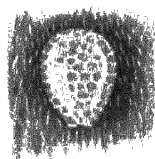
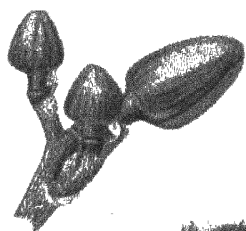




## EXPLANATION OF PLATE II.

### *Diacrotricha Fasciola*, Zeller.

1. Egg laid on bud of *Averrhoa carambola*  $\times$  6.
2. Egg  $\times$  40.
3. Larva in second instar  $\times$  26.
4. Larva, red form  $\times$  13.
5. Larva, pink form  $\times$  13.
6. Larva, green form ; full grown  $\times$  13.
- 7 & 8. Pupae, colour forms,  $\times$  10.
9. Moth  $\times$  7.





it eats from the margin. It is about 6 mm. long and 1.25 mm. broad, cylindrical, slightly convex dorsally, tapering gradually posteriorly and slightly anteriorly; head slightly smaller than prothorax, glossy, very pale yellowish, with red-brown mandibles; its colour is very variable but most often light pink (figure 5) with the central dorsal area greenish and with a greenish dorsal line; the segments are distinctly marked; the tubercles bear groups of short whitish and blackish hairs, the lateral tubercles being much larger than the dorsal ones; thoracic legs glossy, colourless or glassy white; prolegs long, slender, glassy white, hooklets brown; the spiracles, situated between two tubercles, are pale, rather oval, narrowly rimmed with dark brown.

Pupation takes place on the upper or (more usually) the lower surface of a leaf, the cremastral hooks being thrust into a slight webbing of silken threads, and the ventral surface of the pupa being appressed closely to the surface. The pupa is about 5 mm. long and 1 mm. broad, sub-cylindrical, rather flattened ventrally, slightly convex dorsally, usually light green in colour, the dorsal surface with groups of short light-yellow hairs arising from minute tubercles; wings and legs lighter; head anteriorly and at base of each eye with a glossy pale-yellowish cylindrical tapering process beset with minute yellowish hairs; eyes yellow. As previously noted, the pupal period is very short, larvæ which pupated on 10th September emerging as moths on 14th September. At Pusa there seems to be a cessation of breeding during the dry hot weather (March to June).

#### TRICHOPTILUS, WALSINGHAM.

The species included under the generic name *Buckleria* in *Ent. Mem.* VI, pp. 2-9, should be placed under *Trichoptilus*, Wlsm., of which *Buckleria* is a synonym. Mr. Meyrick has suggested (*Cat. Pteroph.*, p. 4; 1913) that *T. paludicola*, Fletcher, is a synonym of *T. paludum*, Zell., and also (*Bull. Hill. Mus.* II. 232: 1928) that *T. xerodes*, Meyr., may be a form of *T. siceliota*, Zeller, but it seems better to keep these distinct pending further evidence. *T. paludicola* occurs in the Khasi Hills at Laitlyngkot and Dumpep and is quite common in marshy places around Shillong, but repeated searches there have failed to reveal any *Drosera* plants or any sign of its early stages. *Drosera* spp. occur commonly in the Palni and Nilgiri Hills in South India, but there I have been unable to find *T. paludicola*, although it should occur.

*T. xerodes*, Meyr., is now known to occur also in South and East Africa and in Palestine. Of *T. wahlbergi*, Zeller, the larva has been noted on *Ipomœa batatas* and *Vitis indica*, but it seems to be attached to *Oxalis* as a rule.

#### SPIENARCHES CAFFER, ZELLER.

*S. caffer* (*Ent. Mem.* VI, pp. 9-13, t. 2) has since been recorded from Palestine, New Guinea, Kermadec Islands, Samoa, Brazil, French Guiana,

Central Africa and the Sudan. It has been reared in the Malay Peninsula from larvæ on pumpkin (Corbett and Gates, *Dept. Agric. F. M. S. Bull.* 38, p. 11 : 1926). In the Sudan it has been noted to be parasitized by the Braconid, *Apanteles paludicolæ*, Cam. 1908 (Wilkinson, *Bull. Ent. Res.* XX, 109 : 1929).

#### OXYPTILUS CAUSODES, MEYR.

This species (*Ent. Mem.* VI, 15) has since been reared at Dehra Dun from larvæ boring into fruits of *Dillenia indica*, which is probably its food-plant at Pusa also, although we have failed to find it as yet. It has also been taken at Karwar.

#### OXYPTILUS ZANCLISTES, MEYR.

*Oxyptilus zanclistes*, Meyr., B. J. XVI, 581-582 (1905)<sup>1</sup>; Meyr., *Cat. Pteroph.*, p. 5 (1913)<sup>2</sup>; Corbett and Gates, *Dept. Agric. F. M. S. Bull.* 38, p. 11 (1926)<sup>3</sup>.

Described from Fort Stedman, in Burma<sup>1</sup>, *O. zanclistes* is also known from Kandy and Maskeliya in Ceylon<sup>2</sup> and from Coorg and the Khasi Hills in India<sup>2</sup>, from Fort Darwin, N. Australia<sup>2</sup>, and from the Malay States<sup>3</sup>, where it was reared from larvæ on flowers of cow-pea.

#### XYROPTILA TECTONICA, MEYR.

*Xyroptila tectonica*, Meyr., *Entom. Mitteil.*, Suppl. III, p. 46 (1914)<sup>1</sup>; Meyr., *Exot. Micr.* II, 420 (1921)<sup>2</sup>.

This species, originally described from Formosa, has since been recorded from Java<sup>2</sup>, where the larva was found on *Bridelia tomentosa* (Euphorbiaceæ), the pupa standing erect on apex of abdomen on the midrib of leaf<sup>2</sup>. I have taken *X. tectonica* at Minbu (Burma) and at Ranchi and a single specimen has also occurred at Pusa. It is also known from Rhodesia and from Nyasaland, in South Africa.

#### PLATYPTILIA SYTHOFFI, SNELLEN.

*Platyptilia taprobanes* [*nec Felder*], Fletcher, *Ent. Mem.* VI, 19, t. 3 f. 1, t. 6 [fig. of pupa] (1921).

The name of this species requires to be changed to *sythoffi*, Snellen. [See note under *P. taprobanes*].

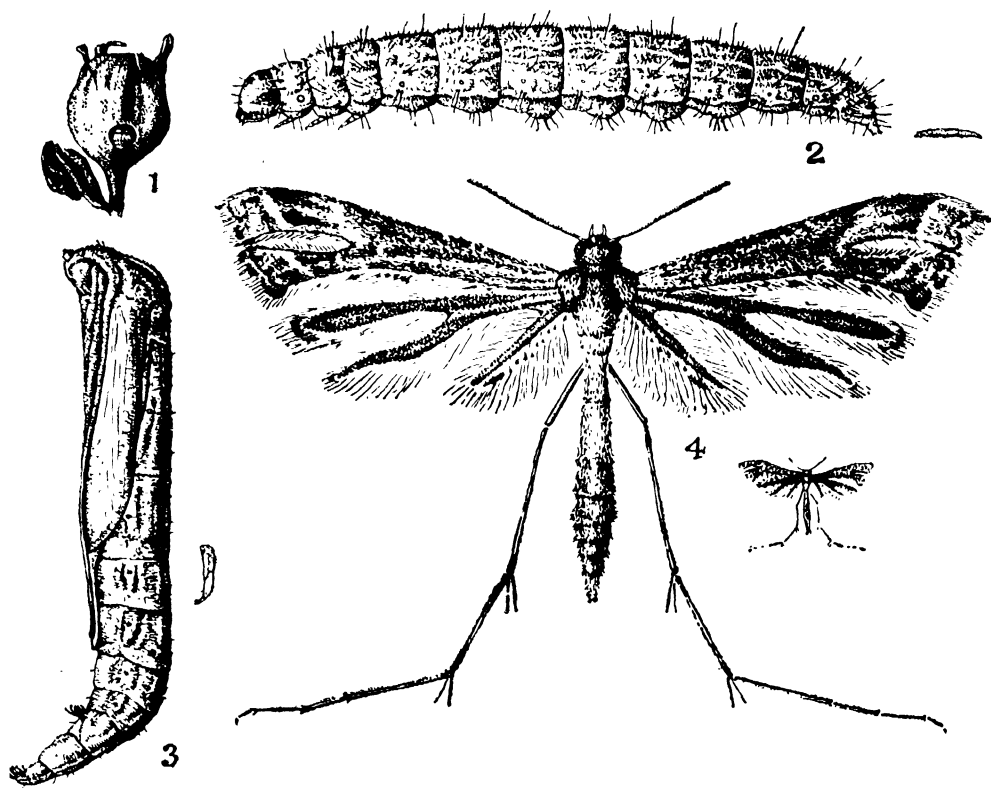
#### PLATYPTILIA PUSILLIDACTYLA, WALKER.

(*Ent. Mem.* VI, pp. 19-21, t. 4, t. 6 [fig. of pupa] : 1921.)

In 1921 specimens, apparently of this species but in poor condition, were received from the Government Botanist, Quilon, who stated that he had reared them on



PLATYPTILIA TAPROBANES, FELDER.



1. Bored fruit  $\times 3$ .

2. Larva  $\times 9$ .

3. Pupa  $\times 9$ .

4. Moth  $\varnothing \times 6$ .

(Smaller figures, life size.)

*Utricularia*. Its distribution includes Fiji, Peru, Brazil, Colombia, Guiana, Central America, Florida, Bermuda Islands, W. Africa, S. Africa and the Seychelles, in addition to the localities previously cited.

PLATYPTILIA TAPROBANES, FELDER (PLATE III).

*Amblyptilia taprobanes*, Felder, Reise Novara, Lep. Het., t. 140 f. 54 (1875)<sup>1</sup>.

*Platyptilia brachymorpha*, Meyr., T. E. S. 1888. 240-241 (1888)<sup>2</sup>; Fletcher, Ind. Agric. Ent. Mem. VI, 21, t. 6 [fig. pupa] (1921)<sup>3</sup>.

*Amblyptilia seeboldi*, Hofmann, Iris XI, 33-34 (1898)<sup>4</sup>.

*Platyptilia crenulata*, Barnes and McDunnough, Contrib. Nat. Hist. Lep. N. America II, 185, t. 3 f. 8 (1913)<sup>5</sup>; *id.*, IV, 316, t. 41 f. 15, t. 50 f. 5 (1921)<sup>6</sup>.

*Platyptilia acanthodactyla* var. *phaenicodactyla*, Chrétien, Ann. S. E. France LXXXIV, 295 (1915)<sup>7</sup>.

*Platyptilia terlizzii*, Turati, Ann. Soc. Ital. Sci. Nat. Milano LXV, 67-68, f. 28 (1926)<sup>8</sup>.

Having examined Felder's type of *taprobanes*, now contained in the British Museum Collection, I find that his name is referable to the species formerly called *brachymorpha*, Meyr. and not to the one which must now be known as *sythoffi*, Snel-len. *P. taprobanes* was previously noted as "a widely distributed species", but its known distribution now also includes Queensland, Brazil, Florida, Arizona, S. California, Algeria, Cyrenaica, Cyprus and Mauritius. In Ceylon, India and Burma it seems to occur mostly in the Plains although it ascends the Hills in the South, having been taken at Haldummulla (about 4,000 feet) in Ceylon and at Kodaikanal (7,000 feet) in the Palni Hills. It is common at Pusa but has not been observed further North in India, although it doubtless occurs.

To the list of larval food-plants must be added fruits of *Limnophila heterophylla* and *Veronica Anagallis* and unripe seeds of *Pentstemon*. The larva usually feeds by eating a hole in the side of a fruit or seedpod and thrusting its anterior extremity inside to devour the unripe seeds. Larvæ were found at Pusa on 9th April 1913 and again in January 1931, feeding on the unripe seeds in the fruits of *Limnophila heterophylla* (Scrophulariaceæ). The full-grown larva was described as 7.5 to 9 mm. long and about 1.3 to 1.5 mm. broad across the first abdominal segment, cylindrical, tapering gradually posteriorly and very slightly anteriorly, light green in colour, head creamy-yellow, smooth and shining, marked with dull-brown spots grouped on the cheeks above ocelli and on vertex, mandibles dark brown, prothorax with a very thin, almost indistinguishable, dorsal chitination, thoracic legs short, shining, glassy-whitish, abdominal segments distinct, covered with very minute scattered black spinous hairs with comparatively longer subdorsal and lateral hairs, a dark green or inkish-purple mid-dorsal stripe, two longitudinal pale-yellowish or whitish subdorsal lines from mesothorax to eighth abdominal segment and a similar subspiracular line from first abdominal segment, prolegs



rather short, slender, glassy-whitish, with minute brown hooklets on incomplete rings, a small portion of the outer margin being devoid of hooklets, spiracles small, slightly elevated, oval, rimmed with dark-brown, situated on pale grey areas.

The pupa is about 7 to 8.5 mm. long and 1.25 to 1.5 mm. broad across the abdominal region which tapers gradually posteriorly, pinkish-brown, pinkish-grey or blackish, the segments not very distinct, third pair of legs reaching almost to apex of fifth abdominal segment; on each side of the mid-dorsal line there is a thin ridge from metathorax nearly to apex of third abdominal segment; all abdominal segments closely but finely striated transversely; spiracles oval, with dark rims. In some pupæ there is a blackish suffusion laterally on the abdominal segments and dorsally on the prothorax. The pupal period is about four days in April and about ten days in the cold weather. Pusa Insectary Cage-Slips Nos. 2257 and 2593).

Other larvæ were found at Pusa on 8th April 1925 on *Veronica Anagallis*, feeding on the seeds by boring into the freshly-formed fruits (C. S. No. 2307). Other larvæ were found at Kodaikanal in August-September 1929 eating unripe seeds of *Pentstemon*.

#### PLATYPTILIA MOLOPIAS, MEYR.

(Ent. Mem. VI, 22, t. 6 [fig. of pupa] .)

This species has also been recorded from South India (Meyr., *Cat. Pteroph.*, p. 13 : 1913) and Mr. Meyrick informs me that he has it from Dibidi (Coorg). *P. molopias* has also been recorded from Madagascar, East South and West Africa, but it seems doubtful whether the African form is really *molopias*.

#### PLATYPTILIA RHODODACTYLA, SCHIFFERMÜLLER (PLATE IV).

*Alucita rhododactyla*, Schiff., Wien Verz. p. 146 (1775)<sup>1</sup>.

*Cnecidophorus rhododactylus*, South, Entom XVIII, 275-277, t. 1 ff. 3, 3<sup>a-d</sup> (1885) [biol.]<sup>2</sup>; Tutt, *Pteroph. Brit.*, pp. 19-22 (1896) [biol.]<sup>3</sup>

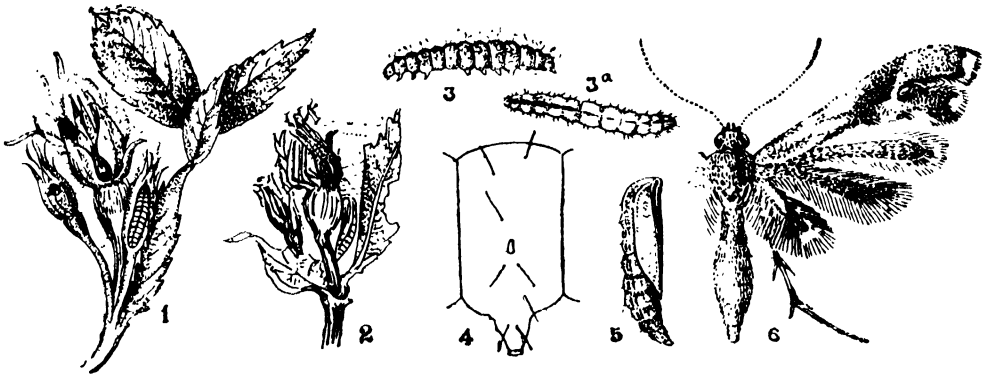
*Eucnemidophorus rhododactylus*, Wlgn., Ent. Tidskr. II, 96 (1881)<sup>4</sup>; Hofmann, Ill. Zeits. Ent. III, 129-131, tab. f. 4 (1898) [larva]<sup>5</sup>; Tutt, *Brit. Lep.* V, 256-257 (1906) [biol.]<sup>6</sup>.

*Platyptilia rhododactyla*, Murtfeldt, Canad. Ent. XXXVI, 334-335 (1904) [biol.]<sup>7</sup>; Meyr., *Rev. Handb.* p. 451 (1928).<sup>8</sup>

This well-known European Plume-moth, whose range extends practically throughout Europe, North Africa, Asia Minor, Central and North Asia and the North Atlantic States of America, is not uncommon in Srinagar, where its larva doubtless feeds on roses cultivated in the gardens there.

The larva is about 12 mm. long and is described by Porritt as "cylindrical and strongly attenuated at the extremities, considerably retractile, and when at rest has a dumpy appearance; head small, globular, smooth and shining grey with the cheeks and mandibles shining black; segmental divisions strongly marked;

PLATYPTILIA RHODODACTYLA, SCHIFFERMÜLLER.

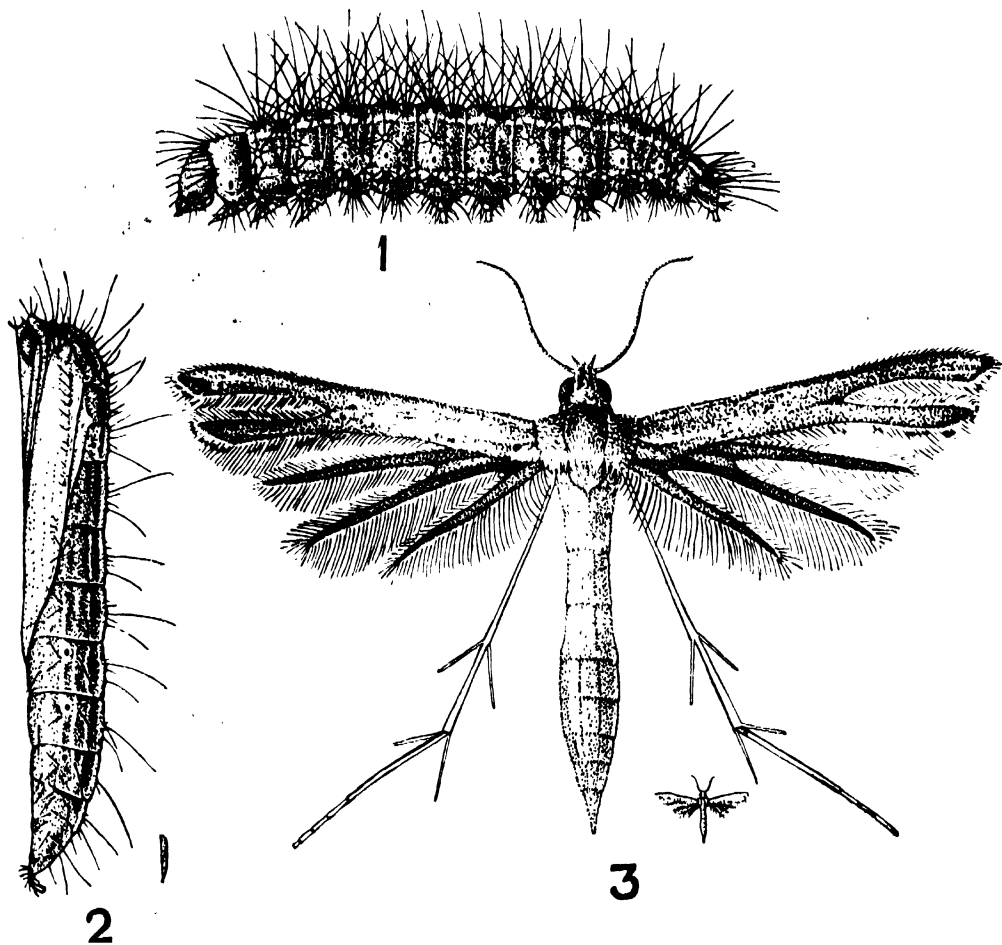


1. Larva feeding on rose shoot (after South).
2. Pupa in position (after South).
3. Larva enlarged, lateral view (after South).
- 3a. Larva, dorsal view, enlarged (after Spuler).
4. Abdominal segment of larva, showing arrangement of setae (after Hofmann).
5. Pupa, enlarged (after South).
6. Moth  $\times 3$  from a Srinagar specimen.





EXELASTIS PUMILIO, ZELLER.



1. Larva  $\times 12$ .

2. Pupa  $\times 12$ .

3. Moth  $\times 9$ .

(Smaller figures, natural size.)

skin soft, slightly rough in appearance, sparingly though conspicuously clothed with short hairs, light greenish-yellow or yellowish-green; dorsal line conspicuously purple, from the second to the sixth segment it appears as composed of round purplish marks joined at the segmental divisions, and rather broad; on the remaining segments it is much narrower and more uniform, but equally distinct; subdorsal and spiracular lines yellow, only faintly indicated; segmental divisions also yellow; ventral surface and prolegs uniformly dingy green or yellowish, according to the colour of the dorsal surface; legs black and shining."

It feeds on roses of various species, both wild and cultivated, feeding on the buds and flowers, sometimes also on the young shoots or leaf-buds, eating into an unexpanded bud from the side and hidden by drawing down a leaf; when the blossom is open, it draws down the petals.

The pupa is attached to the shoot or bunch of buds on which the larva has fed; hanging loosely from a small pad of silk; it is pale green, the wing-cases whitish, eye, antenna and leg-cases, also the edging of the wing-cases, smoky black, and it is curiously sprinkled with fine hairs or long bristles, especially on the dorsal surface. (Porritt).

EXELASTIS PUMILIO, ZELLER. (PLATE V).

*Mimeseoptilus pumilio*, Zell., Verh. z.-b. Ges. Wien XXIII, 324 (1873)<sup>1</sup>.

*Marasmarcha liophanes*, Meyr., T. E. S. 1886, 19 (1886)<sup>2</sup>.

*Leioptilus?* *griseodactylus*, Pagenstecher, Zoologica XXIX, 240. (1900)<sup>3</sup>.

*Exelastis liophanes*, Fletcher, Ind. Agric. Ent. Mem. VI, 26 (1921)<sup>4</sup>.

This species occurs commonly throughout the Plains of India as far North as Bihar, in Ceylon to about 2,000 feet, in the Andamans and in Burma, Outside of India, it is known from China, Formosa, Borneo, Bismarck Islands, New Hebrides, Fiji, Samoa, Society Islands, Marquesas, Austral Islands, Southern United States, West Indies, Barbados, S. Africa, Madagascar, Réunion and the Seychelles.

As previously noted, it was bred at Pusa in 1910 from two pupæ found on the upper surface of leaflet of *Oxalis*. Since then, larvæ were found in November and December 1920 at Pusa on *Alysicarpus Vaginalis*, feeding exposed on the small leaves and sometimes eating the tender stipules. The young larva may also bore into flower-buds. The larva was about 6 to 6.5 mm. long and about 1.5 to 1.75 mm. broad across the middle of the abdomen, cylindrical, tapering gradually towards either extremity; head small, globöse, glossy greenish-yellow, with small black ocelli; prothorax smaller than two following segments; thoracic legs small, shiny, pale-yellowish; general colour of body green or light yellowish-green; a purple or reddish purple middorsal stripe from mesothorax to eighth abdominal segment, the anterior half of this stripe on each segment enlarged; a subdorsal white line from mesothorax to ninth abdominal segment; each segment also with fine purplish longitudinal lines; hairs occur on the head and body, arising on the latter from white fleshy tubercles from each of which arises a tuft of fine black or white

hairs of unequal length ; spiracles small, oval, rimmed with brown ; prolegs green, thin. Prior to pupation, the full-fed larva loses most of the redish-purple dorsal colouration, of which only a thin line remains, the whitish subdorsal lines become yellow and the dorsal and lateral hairs become black. Pupation may take place anywhere on the foodplant, but generally on the surface of a leaf. The pupa is about 6 mm. long and 1.25 mm. broad across the middle of the abdomen, cylindrical, tapering posteriorly ; the wing-cases and legs reach the middle of the fifth abdominal segment ; the first to seventh abdominal segments are distinct, the eighth to tenth fused together ; spiracles rounded, slightly raised on second to seventh segments, and more prominent than in the larval stage ; the spiracle on the eighth abdominal segment is flush with the body-surface ; general colour a light yellowish green ; from the mesothorax to the eighth abdominal segment there is a raised whitish subdorsal ridge bearing fine, short and long, white hairs on each segment ; whitish longitudinal lines run laterally both above and below the spiracles ; there are white hairs on the head and mesothorax, and on the latter also a longitudinal row of short white hairs on either side. The pupal period varies from about four days in July to about two weeks in the cold weather.

Similar specimens have also been reared from *Desmodium* sp. at Pusa.

#### EXELASTIS CREPUSCULARIS, MEYR. (PLATE VI).

*Pterophorus crepuscularis*, Meyr., Ann. Transv. Mus. II, 4, t. 2 f. 2 (1910)<sup>1</sup>.

*Marasmarcha crepuscularis*, Meyr., Ann. Transv. Mus. II, 219 (1911)<sup>2</sup> ; Meyr., Cat. Pteroph., p. 27 (1913)<sup>3</sup>.

*Exelastis pumilio* [nec Zeller], Fletcher, Sci. Report. Agric. Res. Inst. Pusa 1920-21, p. 46, t. 5 ff. 1 A-C (1921)<sup>4</sup>.

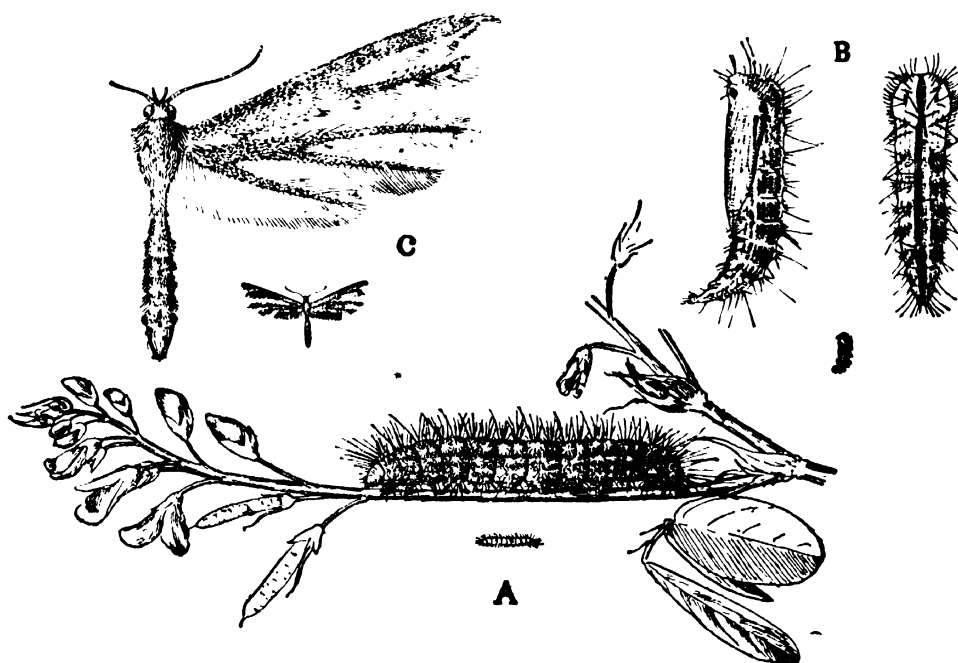
Larvæ collected at Shillong on a wild vetch were brought to Pusa and reared on *Alysicarpus vaginalis*. The larva was about 9 mm. long and 2 mm. broad, cylindrical, tapering slightly towards either extremity ; head small, round, pale yellowish ; body segments not very distinct, yellowish speckled with reddish-purplish, with a dark purple mid-dorsal line, each segment with a number of small tubercles bearing whitish hairs ; prolegs small, slender, pale yellowish ; spiracles inconspicuous.

The pupa was about 7 mm. long and 1.5 mm. broad, pale yellowish-green with a dark purple mid-dorsal line and longitudinal purplish lines laterally ; a distinct subdorsal ridge ; the dorsal and lateral areas with small whitish tubercles, some of which bear three white hairs and some one hair only.

These Shillong specimens were supposed at the time to be *Exelastis* [*pumilio*]-*liophanes*, but were afterwards named by Mr. Meyrick as *crepuscularis*, a species which is otherwise known from the Transvaal and North Australia.

NOTE.—The exact identity of these small species of *Exelastis* seem to be rather uncertain at present. I think that more than one species may be mixed up under the synonymy given under *E. pumilio*. Possibly *E. spinosa*, Meyrick, described from Canton, may also occur within Indian limits.

EXELASTIS CREPUSCULARIS, MEYB.



A. Larva  $\times 5$ .

B. Pupa  $\times 5$ .

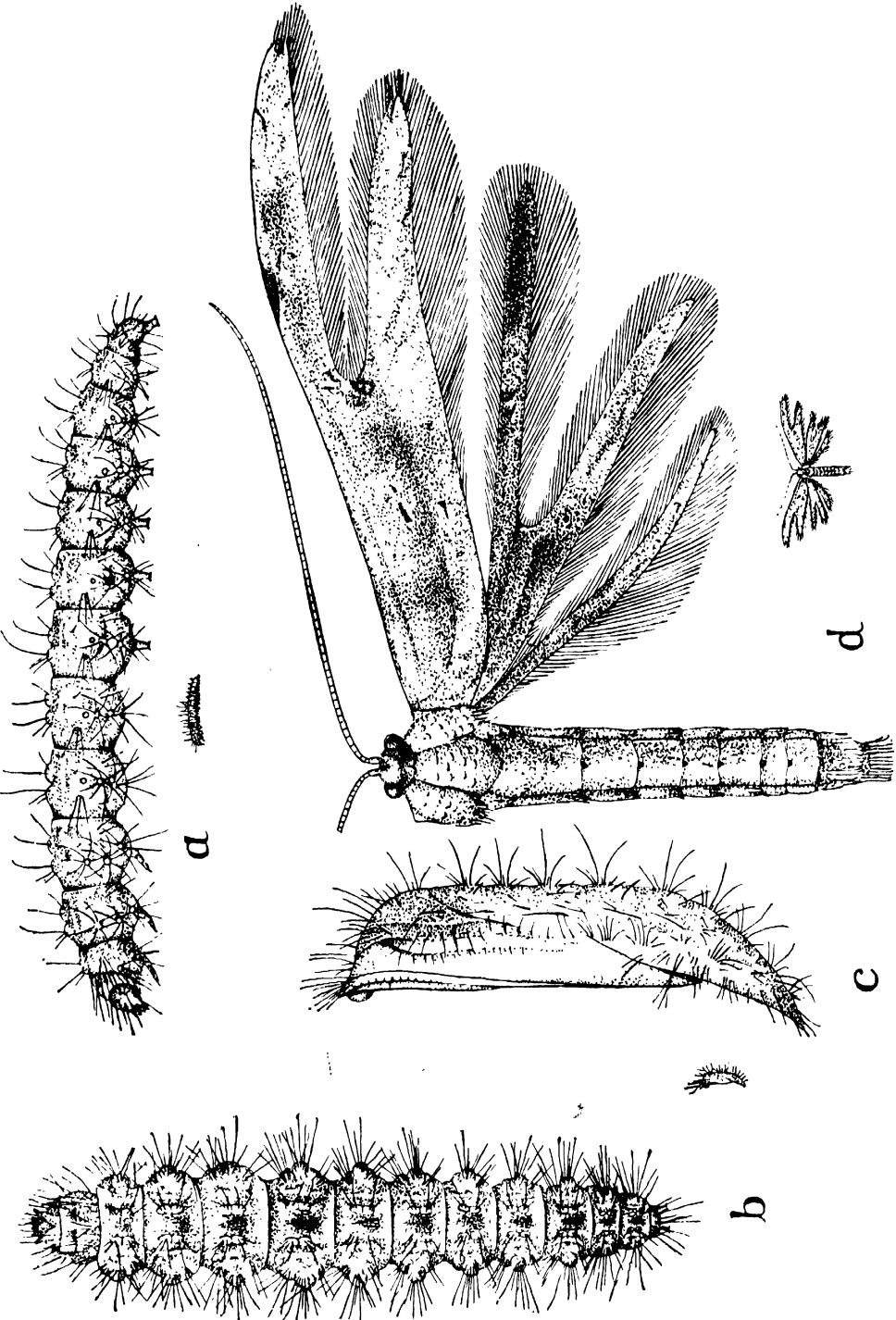
C. Moth  $\times 5$ .

(Smaller figures show natural sizes.)









OIDAEMATOPHORUS LIENIGIANUS, ZELLER.

EXPLANATION OF PLATE VII.

*Oidaematophorus lienigianus*, Zeller.

*a, b.* Caterpillar.

*c.* Pupa.

*d.* Moth.



## EXELASTIS ATOMOSA, WLSM.

(Ent. Mem. VI, pp. 26-28, t. 7).

The larva has been found parasitized by a species of *Protupanteles* (Braconidæ), as recorded by T. V. Ramakrishna Ayyar in *Report of Third Entom. Meeting III*, 933 (December 1920).

This species is also known from Aden (not Sokotra, as stated in *Ent. Mem. VI*, 26), East Africa (Kilimandjaro, 2,500 feet), Transvaal, and Moluccas.

## OIDÆMATOPHORUS LIENIGIANUS, ZELLER. (PLATE VII).

*Pterophorus lienigianus*, Fletcher, Ent. Mem. VI, 29 (1921).

*Pterophorus victorianus*, Strand, Arch. Naturg. LXXVIII, A. 12, p. 130 (1913).

*Oidaematophorus linus*, Barnes and Lindsey, Contrib. Nat. Hist. Lep. N. America IV, 409-410, t. 47 f. 2, t. 52 f. 9 (1921).

Outside of India, this species is now known from China, Japan, Korea, Siberia, Europe, West, South and East Africa, North, Central and South America, Bermuda, Queensland, and the Bismarck Archipelago. Its larva has been recorded on *Artemisia vulgaris*, *A. campestris*, *A. maritima*, *Chrysanthemum*, *Pluchea* and *Solanum melongena*, and at Pusa on a weed locally known as "Khagra", which has since been identified as *Xanthium strumarium*.

On this last plant the larva occurs commonly during the cold weather, living in a sort of tent formed by spinning together the leaves along the midrib by means of silken threads, and feeding on patches (usually commenced from the apex) of the upper green tissue of the leaf surface, the lower epidermis being left untouched; sometimes, the leafstalk is eaten also. Pupation takes place either in this shelter of folded leaves or on the exposed surface of dry leaves, with whose blackish tint the colour of the pupa harmonizes to some extent.

Larvæ were found again at Pusa on 21st and 22nd January 1931 on *Xanthium strumarium*. As a rule, a single larva is found on the upper surface of one leaf, turning over a part of the leaf (usually the edge) and fastening it down with silken threads to form a shelter within which the larva lives and feeds on the green tissue, leaving the lower epidermis intact.

The full-grown larva is about 9 mm. long and 2 mm. broad, cylindrical, tapering very slightly anteriorly from the thoracic region and also posteriorly from the seventh abdominal segment; the head, which is hidden under the prothorax from a dorsal viewpoint, is heart-shaped, glossy, creamy-yellow, with reddish-brown mandibles and black ocelli; prothorax slightly narrower and longer than mesothorax, with numerous medium sized hairs on its anterior margin arising from black tubercles; legs rather short, glassy-whitish, terminal segments light-yellowish apically and bearing reddish-brown claws; general colour light green, with a broad

dark green dorsal stripe which is less evident on thoracic segments ; mesothorax, metathorax and first eight abdominal segments each with a pair of short, fleshy, creamy-whitish trapezoidal tubercles bearing hairs which are whitish, of medium length, and very minutely plumose ; a faint whitish interrupted subdorsal line from mesothorax to seventh abdominal segment ; spiracles small, rounded, with clear centres and black rims, situated on greyish patches ; prolegs rod-like, glassy-white, soles slightly enlarged with incomplete circles of brown hooklets, a short outer portion on each sole being devoid of hooklets.

The pupa is about 7.8 mm. long and 1.5 mm. broad, light green, in some cases dorsally pinkish-purplish ; wing-cases reaching apex of sixth abdominal segment ; all segments with tufts of white, minutely plumose hairs arranged as in the larval stage and there are also shorter hairs on the costal and subcostal areas of the wing-cases ; spiracles rather raised, that on second abdominal segment raised more than the others, circular, with clear centres and brown rims. The pupal period is 9-10 days at the beginning of February. A Braconid parasite emerged from some of the larvæ. (Pusa Insectary Cage-slip No. 2591).

#### OIDÆMATOPHORUS MONODACTYLUS, LINN. (PLATE VIII).

##### *Pterophorus monodactylus*, Ent. Mem. VI, 29.

This species seems to be confined to the North-Western portion of India, being known from Kashmir, Hazara, Parachinar and Masuri. Outside of India it occurs in Japan, Siberia, Central Asia, Asia Minor, throughout Europe, North Africa, East Africa (Kenya, 7,000 feet), Madeira and Canary Islands, and in North America from South Canada to Mexico.

The larva usually feeds on various species of *Convolvulus* and *Ipomœa* but has also occurred on *Chenopodium album*, *Atriplex patula*, *Eupatorium purpureum* and *Calluna vulgaris*.

A description of the larva was given previously and opportunity is now taken to add a figure.

#### ALUCITA CANDIDALIS, WALKER.

*Acipitilus candidalis*, Wlk., Cat. XXX, 948 (1864)<sup>1</sup>.

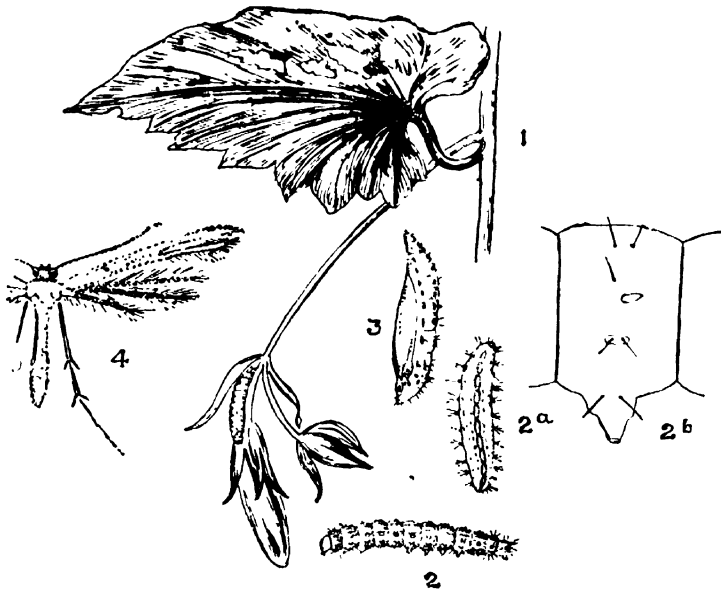
*Acipitilus leucadactylus*, Wlk., Cat. XXX, 949 (1864)<sup>2</sup> ; Moore, Lep. Ceylon III, 528, t. 209 f. 15 (1887)<sup>2</sup>.

*Alucita candidalis*, Meyr., T. E. S. 1907. 490 (1908)<sup>3</sup> ; Fletcher, Spol. Zeylan. VI, 36 (1909)<sup>4</sup>.

? *Pterophorus millierei*, Montrouzier, Ann. Soc. Linn. Lyon, XI, 253 (1864)<sup>5</sup>.

This species occurs in Ceylon, chiefly in the low-country but as high up as Maskeliya and Haldummulla, in South India (Coimbatore and Coorg) and in the Khasi

**OIDAEMATOPHORUS MONODACTYLUS, LINN.**



1. Larva, natural size, on Convolvulus (after South.)
2. } Larva, enlarged (after South and Spuler).
- 2a. }
- 2b. Abdominal segment of larva in first instar, showing setae (after Hofmann).
3. Pupa enlarged (after South).
4. Moth  $\times 3$  from a specimen from Kashmir.





Hills. Outside of India it is known from Malaya, Philippines, Formosa, New Guinea, New Caledonia, Queensland, Samoa, Tonga, New Hebrides, British East Africa, Central, West and South Africa.

The larva is said to feed on *Argyreia* but has not been described.

ALUCITA NIVEODACTYLA, PAGENSTECHER.

(Ent. Mem. VI, 30).

The larva has been found on sweet potato in the Malay States by Corbett and Gates (*Dept. Agric. F. M. S. Bull.* 38, p. 11 ; 1926).

In India *A. niveodactyla* also occurs in Travancore and we have it from Lumding and Tinsukia, in Assam. Outside of India it occurs also in Borneo, Sumatra, Solomon Islands and Queensland.

AGDISTIS TAMARICIS, ZELLER.

(Ent. Mem. VI, 31 : 1921).

This seems to have been noted so far only in North India, at Karachi and Peshawar, but is probably more widely distributed wherever *Tamarix* occurs. The moths in this group are generally very difficult to find in the daytime, remaining closely hidden amongst their food-plants, and flying only at dusk, but are sometimes attracted to light, and *A. tamaricis* has been found on sugared trees in South France.

Hofmann gives the following description of the larva and pupa after Millière :—  
“ The larva hibernates in its first instar ; it is still very small in the Spring, of a brown colour, and continues to live closely appressed to the branches of its food-plant up to the Spring. After that, it grows very quickly and is full grown in the beginning of May [in South France]. The first segment is provided with four tubercles (warts) which end in a point and are comparatively small. The second, third, fifth and tenth segments each bear two warts, which are somewhat higher than those on the first segment ; the warts on the second segment are the highest. The eleventh segment carries a spike bent backwards, higher than the others. Head small, rounded, unicolorous with the body. Trapezoidals (*i.e.*, dorsal warts) black, spiracles white. Typical colour dark reddish ; yet the larva varies much from light-grey to grass-green, mixed with redish colouring on the second, fourth, eighth and twelfth segments. It lives on *Tamarix gallica* all along the coast, frequently also on *Myricaria germanica* on the Islands in the Rhone, and attaches itself to the branches to pupate head downwards. The pupa has very long wing (and leg) cases terminating in a point and these do not lie close to the body for a half of their length. Colouring usually dark-reddish sprinkled with whitish points. The moth emerges after 20-25 days ” [and is double-brooded in Europe].

Later (*Ber. Nat. Ver. Regensburg* V, pp. 208-209 : 1896) Hofmann gave a further description of the pupa, as follows:—"10-11 mm. long, slender, at the capital extremity with a short, stumpy point directed backwards; lateral keels present only on mesothorax; the metathorax projects at its anterior margin in the form of a small stumpy hump; lateral keels and warts are wholly absent. The skin is strongly wrinkled transversely and only furnished, especially towards the end of the abdomen, with very small, short, white, isolated hairs only clearly visible under strong magnification. The cremaster is short above and stumpily cone-shaped, elongated beneath, swollen at the sides, hollowed out in the middle; the anal aperture is marked by two small dark-brown tubercles, the sexual aperture by a dark-brown almost quadrangular plate. On the hinder-margin occur thickly-crowded pick-shaped bent hairs. Between the anal and the genital apertures run two dark brown parallel longitudinal lines. The veins of the wing-sheaths, which reach as far as the anterior margin of the fifth abdominal segment, are raised but not bristly. The very long and slender leg-cases reach to the middle of the seventh abdominal segment. The colour of the pupa is a dirty pale brown, darker on the wing- and leg-cases; over the back of the abdominal segments run two clear yellowish longitudinal lines and on the outer side of each of the fourth to sixth segments is a black roundish spot. The pattern is, however, hardly visible in many pupæ".

Chapman's description (*Tutt's Brit. Lep.* V, p. 132 : 1906) of the larva of *Agdistis tamaricis* is rather in comparison with those of other species of *Agdistis*, but may be added here to make it accessible to Indian workers:—"The prothorax carries four trapezoidally-placed, humped, low and rounded tubercles; also a central one at posterior margin of segment (with twin hair-base but no hair); three small tubercular bosses in line with the front trapezoidals, one above and two below spiracle; another small one above spiracle (apparently on a segmental element between those of dorsal tubercles, but to which spiracle belongs). The mesothorax carries two large tall pillars . . . . . conjoined so that only their tops are distinct, and with a third tubercular boss on the outer posterior aspect, so that the pillar represents three tubercles; below these on either side is another flat tubercle, and lower two others at approximately similar levels; a small one at base of leg. The metathorax has a dorsal tubercle with two hairs but no prominent boss; below this is a small one, and two others lower, the posterior a little the higher of the two. On the abdominal segments i and ii are distinct, but very close together; iii is close above the spiracle. The second and fifth abdominals have the curious prominences curved over to each other and carrying i and ii. On these and the other abdominal segments the minute hairs have [a] backward direction".

Tutt (*t. c.*, pp. 128-130) further notes that the larva of *Agdistis tamaricis* is "highly specialized, having the caudal horn single and a central horn on the prothorax, [all hairs clubbed]; a double front horn occurs on the mesothorax but not on the metathorax; i and ii are small on the abdominal segments and approximated

except on 2 and 5, where they form peculiar processes like those seen on some *Pyralid* pupæ; on the eighth abdominal, i and ii are more pronounced, forming four black tubercles, whilst, on the ninth, they form a horn constricted at about half its length, after a swelling which represents two tubercles, and has a hair at each side, [and] the horn has a second pair of hairs at its tip. Each of the two tall mesothoracic horns carries three tubercles, slight elevations with whitish tips, *viz.*, a higher anterior, a posterior, and a lateral one. On the abdominal segments iii (immediately above spiracle), iv (a good way behind and rather below spiracle) and v (much below spiracle) each forms a small white point (? short hair). The anal segment has eight longish bristles. The spiracles are large and prominent, especially the prothoracic and eighth abdominal, which are set on small yellow knobs.

"The detailed resemblance exhibited by the *Agdistid* larvæ to their food plant for protective purposes is very striking. In the young larva of *tamaricis*, the second and fifth abdominal segments are brown, and the mesothorax partly so, the rest green with a brown dorsal mark, and so mimicking the tamarisk. The brown larva has usually traces of a reddish or orange spiracular band, and, occasionally, a full-fed larva retains the green coloration, reminding one very much, both in colour and protuberances, of the larva of *Geometra papilionaria* when it assumes its spring clothing. It has a yellowish-white subspiracular band, only marked at the incisions, except on the forward and hinder segments, and interrupted by rich brown patches, especially on the meso and meta-thorax, and more or less to fifth abdominal. The second and fifth abdominals are rich red-brown, and the humps on the mesothorax and eighth and ninth abdominals are brown, the front humps of the second and fifth abdominals nearly black; there is a darker dorsal line, edged with paler, almost yellow. The general effect, however, is of a greenish larva with reddish markings, which imitates closely the colouring of the green twigs of *Tamarix*, just as the brown form does the older twigs on which the full-grown larvæ usually rest".

Lord Walsingham (*Proc. Zool. Soc. London* 1907, p. 925 : 1908) notes that preserved larvæ of *A. tamaricis* from Tenerife "show a curious modification in form, the tuberculous excrescences on the prothorax and mesothorax, and on the second, fifth and ninth abdominal somites, although similarly placed, are distinctly exaggerated, being at least one-third longer than in European specimens, a peculiarity in which they are at least closely approached by larvæ from Algeria".

### PHALONIADÆ.

It may be noted that *Clysia ambiguella*, Hb., referred to in *Entom. Mem.* VI, 34, does not occur in the Indian Region. The Indian specimens formerly identified as *C. ambiguella* have since been separated as (1) *C. turbinaris*, Meyr., from the Khasi and Naga Hills, N. Manipur, and Karen Hills, and (2) *Euxanthia apimnesta*, Meyrick, from Kumaon. The life histories of these species are unknown.

## CLYSIA EUCALYPTA, MEYRICK.

*Clysia eucalypta*, Meyr., Exot. Micr. III, 436 (1928)<sup>1</sup>.

Bred in February from a case-bearing larva found at Bentota, Ceylon, on *Scavola kænigii* (Goodeniaceæ) (Fletcher); case consisting apparently of a flower-corolla, subcylindrical, 6 mm. × 3 mm., narrow at mouth (base), five-cleft at apex, rather densely hairy all over, brownish, hairs grey-whitish.<sup>1</sup>

From my Journal I note further that the moth was bred on 23rd February 1907 from a larval case found on *Scavola kænigii* on the beach at Bentota on 7th February. "The case looks just like a seed, and is attached by one end to any part of the leaf indifferently, but usually on the under surface. The pupa emerges for eclosion, only the caudal segments remaining in the case. The moth rests like a small Noctuid and seems very sluggish. Two minute Hymenopterous parasites also emerged from these cases".

## TORTRICIDÆ.

## HOMONA COFFEARIA, NIETNER.

(Ent. Mem. VI, 25-27).

This species has been reared in the Malay Peninsula on indigo (Corbett and Gates, *Dept. Agric. F. M. S. Bull.* 38, p. 9 : 1926).

## HOMONA MENCIAANA, WALKER.

The synonymy, as given in *Ent. Mem.* VI, 37, requires amendment by the omission of *pullatana*, Snellen, which is a distinct species belonging to the genus *Ulo-*  
*demis*.

## CACCECIA COMPACTA, MEYRICK.

(Ent. Mem. VI, 39).

This has also been reared at Pusa, on 10 August 1923, from a pupa in rolled leaf of *Cedrela toona*.

## CACCECIA DISPILANA, WALKER.

(Ent. Mem. VI, 39-40).

This species has been reared in the Malay Peninsula from larvæ rolling leaves of *rambutan* (*Nephelium lappaceum*) (Corbett and Gates, *Dept. Agric. F. M. S., Bull.* 38, p. 9 : 1926).

## CACÆCIA EDUCTANA, WALKER.

*Pandemis eductana*, Wlk., Cat. XXVIII, 310 (1863)<sup>1</sup>.

*Cacæcia eductana*, de Joannis, Ann. Soc. Ent. France XCIX, 713 (1931)<sup>2</sup>.

Described from Moulmein<sup>1</sup> and known also from Borneo, Tonkin and Canton (S. China). In Tonkin the larva has been found on mulberry, withered flowers of tea, and on beans<sup>2</sup>.

## CACÆCIA EPICYRTA, MEYRICK.

(*Ent. Mem.* VI, 38).

Also reared at Coimbatore from larvæ on mulberry leaves and on green Chillies, and in Tonkin on tea and *Ixora*.

## CACÆCIA ISOCYRTA, MEYRICK.

(*Ent. Mem.* VI, 39.)

This has been reared in the Malay Peninsula from larvæ folding the leaves of *Citrus medica acida* (Corbett and Gates, *Dept. Agric. F. M. S., Bull.* 38, p. 9 : 1926).

## CACÆCIA MICACEANA, WALKER.

(*Ent. Mem.* VI, 38.)

This has also been reared in Tonkin from larvæ on *Phaseolus radiatus*, " taros rouges, patates ", *Hibiscus*, strawberry, Soya, *Ixora*, tea and mulberry.

## CACÆCIA POMIVORA, MEYRICK.

*Cacæcia pomivora*, Meyr., Exot. Micr. II, 340-341 (1920)<sup>1</sup>; Fletcher, Ind. Agric. Ent. Mem. VI, 197-198, t. 58 f. 1 (1921)<sup>2</sup>.

*Cacæcia pomivora* also occurs at Shillong, where the larva has been found rolling leaves of apple and of rose.

## CACÆCIA SOLIDA, MEYRICK.

*Cacæcia solida*, Meyr., B. J. XVIII, 614-615 (1908).

*C. solida* occurs along the south slope of the Himalaya and is known from Darjiling and Kurseong in Sikkim, Masuri and Dehra Dun and from Srinagar.

At Dehra Dun a larva, collected on *Cedrela toona* leaves on 13th September 1915, pupated on 15th September and emerged on 23rd September.

## CACÆCIA TERMIS, MEYRICK.

*Cacæcia termis*, Meyr., Exot. Micr. II, 164 (1918) ♂<sup>1</sup>; II, 340 (1920) ♀<sup>2</sup>.

Bred at Shillong from a larva found rolling apple leaves. It also occurs at Simla,

## ULODEMIS TRIGRAPHA, MEYRICK.

(Ent. Mem. VI, pp. 40, 198 t. 58 f. 2.)

Also bred at Shillong from larva boring in rose-bud, and from a larva rolling *Citrus* leaves. It also occurs in Tonkin.

## DIACTENIS PTERONEURA, MEYRICK.

*Diactenis pteroneura*, Meyr., B. J. XVII, 980 ♂ ♀<sup>1</sup>; Meyr., Wyts. Gen. Ins., fasc. 149, p. 49 [part.], t. 3 f. 35 (1913)<sup>2</sup>; Meyr., Exot. Micr. III, 458 (1928)<sup>3</sup>.

Bred at Pusa on 19th December 1927 from a pupa found on leaves of *Nyctanthes arbor-tristis*.

This species has been recorded from Maskeliya<sup>1</sup> and Madulsima<sup>1</sup>, in Ceylon, and from Coorg.<sup>1</sup>

## EBODA CELLIGERA, MEYRICK.

*Eboda celligera*, Meyr., Exot. Micr. II, 170 (1917)<sup>1</sup>; de Joannis, Ann. Soc. Ent. France XCIX, 714 (1931)<sup>2</sup>.

This species occurs at Pusa and larvæ have been found in Tonkin on leaves of litchi<sup>2</sup>.

## EBODA OBSTINATA, MEYRICK. (PLATE IX.)

(Ent. Mem. VI, 41-42.)

Larvæ were found at Pusa in August 1922 rolling and binding leaves of a creeper (*Cardiospermum helicacabum*), tying up two or three leaflets and feeding irregularly on the leaves or sometimes nibbling the upper surface.

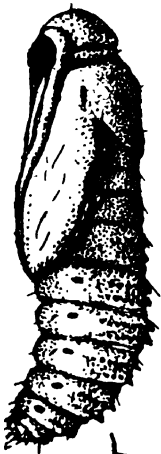
The full-grown larva is about 11 mm. long and 1 mm. broad, cylindrical; head as long as prothorax, shining light yellow, with a few scattered fine hairs, and a small black spot behind the black ocelli; prothorax smooth, very slightly chitinized, light green; thoracic legs creamy, smooth; body light green, segments distinct, with short hairs on tubercles and with an indistinct dorsal and prominent sub-dorsal and spiracular white lines from mesothorax; spiracles minute, rounded, rimmed with pale brown; prolegs short, light green, with hooklets in complete circles. Before pupation a purplish-brown colour develops between the lateral stripes, which become less evident, whilst the middorsal line also becomes darker, patches of pinkish-purple develop below the spiracular line and the general body-colour becomes bluish-green, the meso- and meta-thorax having a pinkish-purple dot on each side.

Pupation takes place in a white elongate-oval cocoon formed inside a rolled leaf. The pupa is about 6 mm. long and 1.5 mm. broad, cylindrical, gradually tapering posteriorly, the abdomen curved ventrally from the fifth segment; brown;

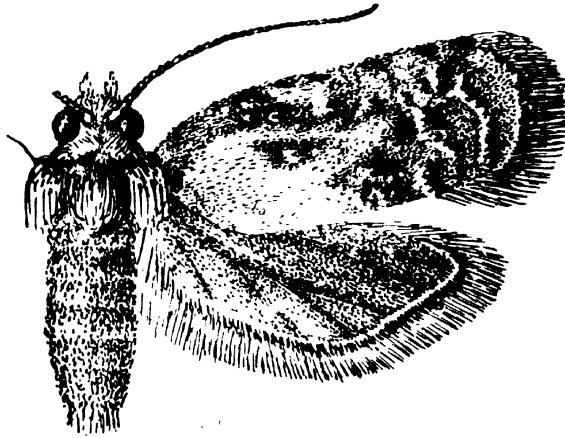
EBODA OBSTINATA, MEYRICK.



a



b



c

a. Larva  $\times 9$ .

b. Pupa  $\times 9$ .

c. Moth  $\times 9$ .

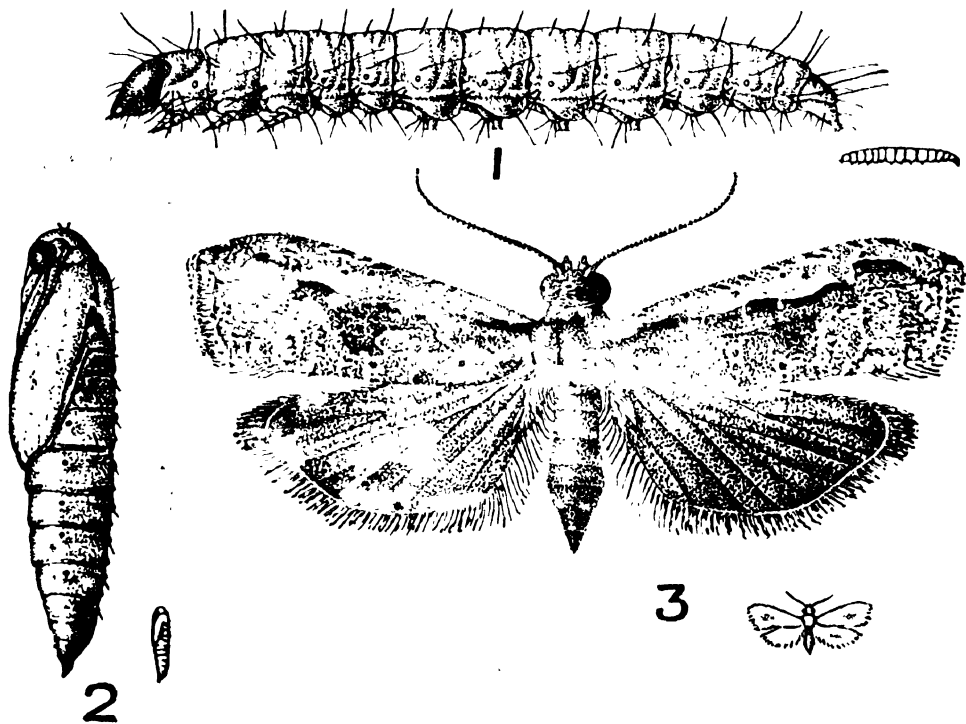
(Small figures, natural size.)







PERONEA FLEXILINEANA, WALKER.



1. Larva  $\times 6$ .
2. Pupa  $\times 6$ .
3. Moth  $\times 6$ .

(Smaller figures show the natural sizes.)

wing-covers extending to fourth abdominal segment; third to eighth abdominal segments with a double transverse row of spines, spines on third segment smaller, on fourth to eighth segments spines of anterior row (opposite spiracles) slightly larger than those of posterior row, ninth segment with only one row of dorsal spines; spiracles oval, rimmed with darker brown. The pupal period is 5 or 6 days at the end of August. (Pusa Insectary Cage-Slip No. 2237.)

PERONEA ENITESCENS, MEYRICK.

*Peronea enitescens*, Meyr., Exot. Micr. I, 16 (1912) ♂ ♀<sup>1</sup>; Meyr., Ent. Mitteil., Suppl. III, p. 48 (1914)<sup>2</sup>.

This species is common in the Khasi Hills around Shillong and we have it from Cherrapunji also. It has been bred in Shillong from a larva spinning up a top-shoot of a wild *Rubus*.

*P. enitescens* has been recorded from the Khasi Hills<sup>1</sup> and from Formosa<sup>2</sup> and also occurs in Java.

PERONEA FLEXILINEANA, WALKER. (PLATE X.)

*Sciaphila flexilineana*, Wlk., Cat. XXVIII, 345-346 (1863)<sup>1</sup>.

*Phricanthes macroura*, Lower, Tr. R. Soc. S. Austral, XXXII, 322-323 (1908)<sup>2</sup>.

*Peronea flexilineana*, Meyr., Proc. Linn. Soc. N. S. W., XXXV, 292 (1910)<sup>3</sup>; Meyr., T. E. S., 1917, 14 (1917)<sup>4</sup>.

*P. flexilineana* is known from Ceylon<sup>1</sup> (Puttalam, Kandy, Peradeniya, Hara-gama, Rambhukkana, Maskeliya), India (Goody, Khasis, Andamans), Burma, Java, Philippines, New Guinea, Queensland<sup>2</sup>, and British Guiana<sup>4</sup>.

It has been reared at Pusa in September and December 1928 and in July 1929 from larvæ found on *Dillenia indica*, binding together the two margins of a leaf and feeding on the upper surface of the leaf, leaving the lower epidermis intact, the larval frass accumulating within the shelter. The full-grown larva is about 17 mm. long and 2 mm. broad, cylindrical, moderately stout, tapering slightly towards either extremity; head shining yellow-brown with a black elongate mark behind ocelli; prothoracic shield shining, yellowish; legs glossy, creamy or brownish; general colour of body light green or creamy with a greenish tinge due to ingested food; prolegs short, broad, with complete circle of hooklets; spiracles small, rounded, almost colourless; the internal white tracheal tube visible through the skin below the spiracles; anal plate shining, yellowish; fine single hairs arising from warts, anterior trapezoidals much shorter than posterior.

Prior to pupation, the larva becomes light yellowish. It forms a thin silken cocoon or lining in an enclosure formed by turning down the edge of a leaf. The pupa is about 9 mm. long by 2 mm. broad, cylindrical, tapering posteriorly, yellowish-brown, darker dorsally, wing-cases reaching to anterior margin of fourth

abdominal segment, third to seventh abdominal segments each with two transverse rows of small spines dorsally, the spines of anterior row larger and running to spiracles, second and eighth segments with a single row of spines, spiracles oval, brown, that on eighth segment closed. The pupal period is 4 or 5 days in the Hot Weather. (Pusa Insectary Cage-Slip No. 2404).

## EUCOSMIDÆ.

### SPILONOTA CALCEATA, MEYRICK.

*Tmetocera calceata*, Meyr., B. J. XVIII, 141 (1907) ♂ ♀ <sup>1</sup>.

Described from the Khasi Hills.<sup>1</sup> Reared at Shillong in May 1924 from larvæ found binding top-leaves and shoots of *Pieris ovalifolia*; five or six leaves may be bound together in a bunch, in which the larva lives in a white cocoon-like shelter, eating the surfaces and margins of the leaves.

The larva is about 12.5 mm. long and 2 mm. broad, cylindrical, tapering slightly posteriorly; head as broad as prothorax, shining red-brown; prothoracic shield chitinized, distinct, shining dark-brown, covering entire segment, dorsal end with a narrow median marking; legs shining black-brown; body dark pink, segments distinct, each with chitinized oval dark brown patches [warts] situated trapezoidally along dorsum and on sides, each patch emitting a fine, short, brown hair; prolegs short, broad, cylindrical, glossy whitish, with complete circles of hooks on rather oval rims; spiracles small, round, clear in centre, with dark brown oval rims.

Pupation takes place in white cocoons which are generally covered with pellets of frass and which are formed within the larval shelter. (Mr. Bose's Cage-Slip, Shillong, No. 17.)

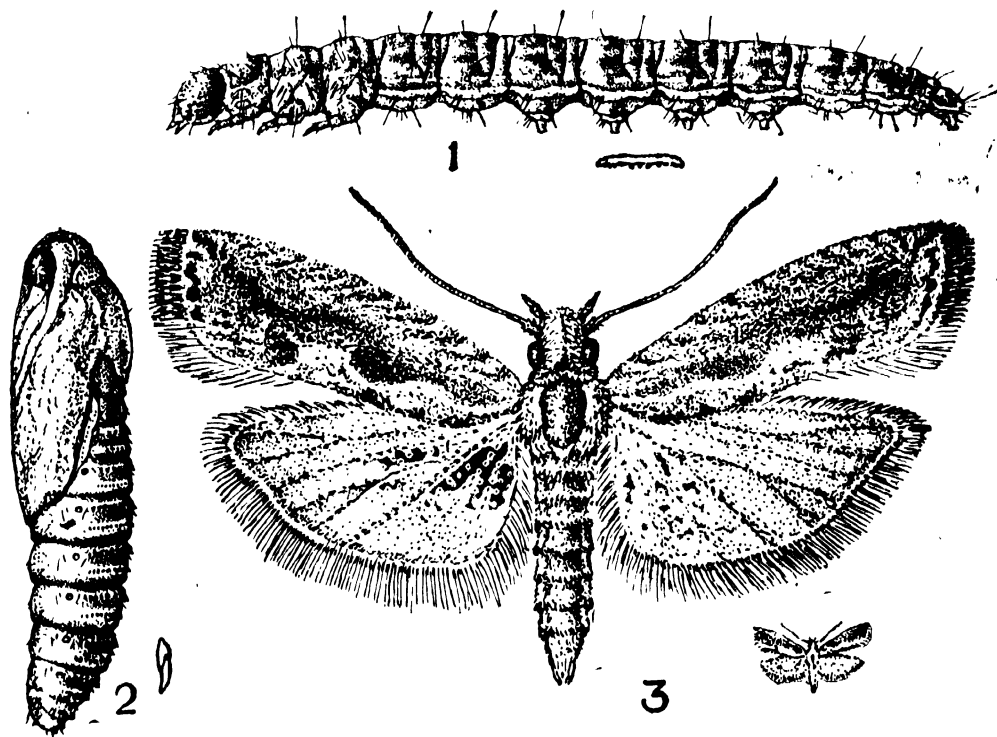
### SPILONOTA RHOTHIA, MEYRICK. (PLATE XI.)

(Ent. Mem. VI, 43-44.)

*Spilonota rorthia* has been reared at Pusa from larvæ found on *Psidium guyava* in November 1929 and on *Eugenia jambolana* in March 1930 and 1931, rolling the tenderer leaves and eating holes through the leaf-tissue.

The full-grown larva is 10-14 mm. long and 1.5-2 mm. broad, cylindrical, tapering gradually posteriorly; head small, glossy, creamy or yellowish-brown; prothoracic shield chitinized, yellowish-brown with a black line on the hind margin; thoracic legs creamy, the two basal segments greyish; general colour dull green with a darker mid-dorsal line from mesothorax to end of eighth abdominal segment, and a similar subdorsal line, the body bearing short fine hairs arising from whitish tubercles; spiracles small, circular, with clear centres and narrow black-

ISPILONOTA RHOTHIA, MEYRICK.



1. Larva  $\times 9$ .

2. Pupa  $\times 9$ .

3. Moth  $\times 7$ .

(The smaller figures show the natural sizes.)



kish rims ; prolegs very short, cylindrical, glassy whitish with complete circles of brown hooklets ; anal plate black with a white centre.

The larva pupates in a flimsy cocoon formed within a shelter made by binding over a portion of a leaf. The pupa is about 6.25—7 mm. long and 2 mm. broad, cylindrical, tapering gradually posteriorly ; yellowish-brown ; second to eighth abdominal segments with two transverse rows of small spines, those of anterior row larger than those of posterior row, which are minute ; ninth and tenth segments with a single row of spines ; spiracles small, circular, rimmed with dark brown. The pupal period is about three weeks in December and seven or eight days in March. (Pusa Insectary Cage-Slips 2467, 2484.)

We have this also from Shillong and Chapra.

#### ACROCLITA CANTHONIAS, MEYRICK.

*Acroclita canthonias*, Meyr., Exotic. Micr. II 343 (1920)<sup>1</sup>, III 438 (1928)<sup>2</sup>.

Described from Pusa, where it was reared from larvæ binding leaves of *Loranthus*, also on the flowers and boring in the shoots<sup>2</sup>. It also occurs at Shillong.

#### ACROCLITA CHERADOTA, MEYRICK.

(Ent. Mem. VI, 44.)

*Acroclita cheradota* seems to be attached to species of *Ficus*. It has been reared at Pusa from larvæ on leaves of *Ficus glomerata* and *F. religiosa*, binding superposed leaves with thick cords of silk and feeding between the leaf-veins on the green tissue so that attacked leaves become skeletonized.

The full-grown larva is about 9 mm. long and 1.25 mm. broad, cylindrical, tapering gradually posteriorly ; head nearly as broad as prothorax, shining pale yellow with a central triangular brownish marking, a black patch on which the ocelli are situated and an elongate black patch behind this ; prothorax shining pale yellow, with a black mark above and behind the spiracle and a small black mark below and before the spiracle ; meso- and meta-thoracic segments rather larger than prothorax ; legs shining, piceous ; general colour light yellow or greenish yellow ; the mesothoracic to ninth abdominal segments suffused blackish subdorsally and laterally so that a pale yellowish dorsal stripe remains and the ventral area is also pale ; dorsal hairs shorter than lateral ; prolegs short, with complete circles of hooklets ; anal plate blackish ; spiracles minute.

Pupation takes place in a white cocoon which may be covered with frass. The pupa is about 6 mm. long and 1.5 mm. broad, cylindrical, tapering gradually, yellowish brown ; the first six abdominal segments distinct as their hind margins are darker brown ; seventh and following segments rather close-set ; spiracles prominent, rounded, with brown rims ; second to eighth abdominal segments with two transverse rows of spines, reaching to spiracles, those of anterior row larger and more



separated than those of posterior ; ninth segment with a single row of minute spines ; wing-cases reaching fourth abdominal segment. The pupal period is 8-10 days in March. (Pusa Insectary Cage-Slip No. 2209.)

*A. cheradota* is also known from Tonkin.

#### ACROCLITA MICRORRHYNCHA, MEYRICK.

*Acroclita microrrhyncha*, Meyr., M. S.

Bred at Parachinar, N. W. Frontier Province, from a larva feeding on apple leaves on 21st September 1917, and which emerged on 2nd October 1917.

#### ACROCLITA PHYSALODES, MEYRICK.

*Rhopobota physalodes*, Meyr., T. E. S., 1910, 368-369 (1910) ♂ ♀ <sup>1</sup>.

*Acroclita physalodes*, Meyr., T. E. S., LXXVI, 495 (1929)<sup>2</sup>.

*A. physalodes* was originally collected by me in Ile du Coin, Chagos Islands and also at Galle, in Ceylon<sup>1</sup>. It has since been recorded from the Seychelles, Fiji and Austral Islands (Pacific)<sup>2</sup>. It has been bred in Fiji from larvæ in flower-buds of *Barringtonia*.

#### ANCYLIS AROMATIAS, MEYRICK.

*Ancylis aromatius*, Meyr., Exot. Micr., I, 31 (1912)<sup>1</sup> ; de Joannis, Ann. Soc. Ent. France XCIX, 716 (1931)<sup>2</sup>.

Described from North Coorg<sup>1</sup> and has since been found in Tonkin, where its larva feeds on *Zizyphus jujuba*<sup>2</sup>.

#### ANCYLIS CARPALIMA, MEYRICK.

(Ent. Mem. VI, 45.)

This is an Australian species and should be omitted from the Indian List. Indian specimens, formerly identified as *A. carpalima*, were presumably *A. lutescens*, Meyr., whose larva feeds on leaves of *Zizyphus jujuba* and which is also known from Tonkin.

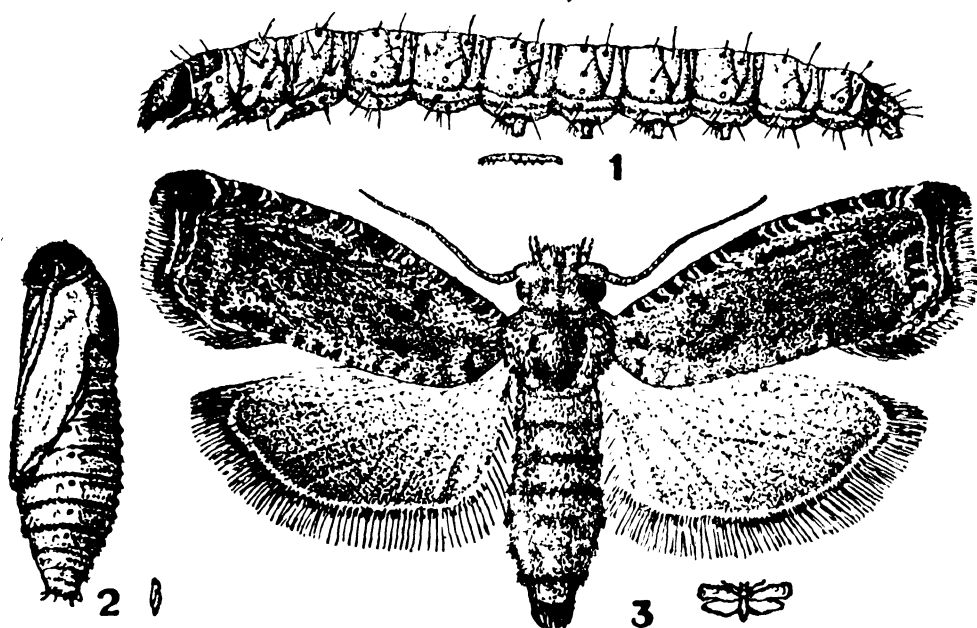
#### CROCIDOSEMA PLEBEIANA, ZELLER.

(Ent. Mem. VI, 52-53.)

This species seems to be South American in origin but is now very widely distributed, occurring throughout Southern Europe and even as far North as Devon (England) and Germany, all along Northern Africa, in British East Africa, the Seychelles, Farquhar Island, Rodriguez, Transvaal, Madeira and Canary Islands and St. Helena, Syria, Cambodia, Formosa, Australia, New Zealand, Tonga, Fiji, Samoa, Hawaiian Islands, Marquesas, Society Islands and Austral Islands in the Pacific,



EUCOSMA CONCILIATA, MEYRICK.



1. Larva  $\times$  9.

2. Pupa  $\times$  9.

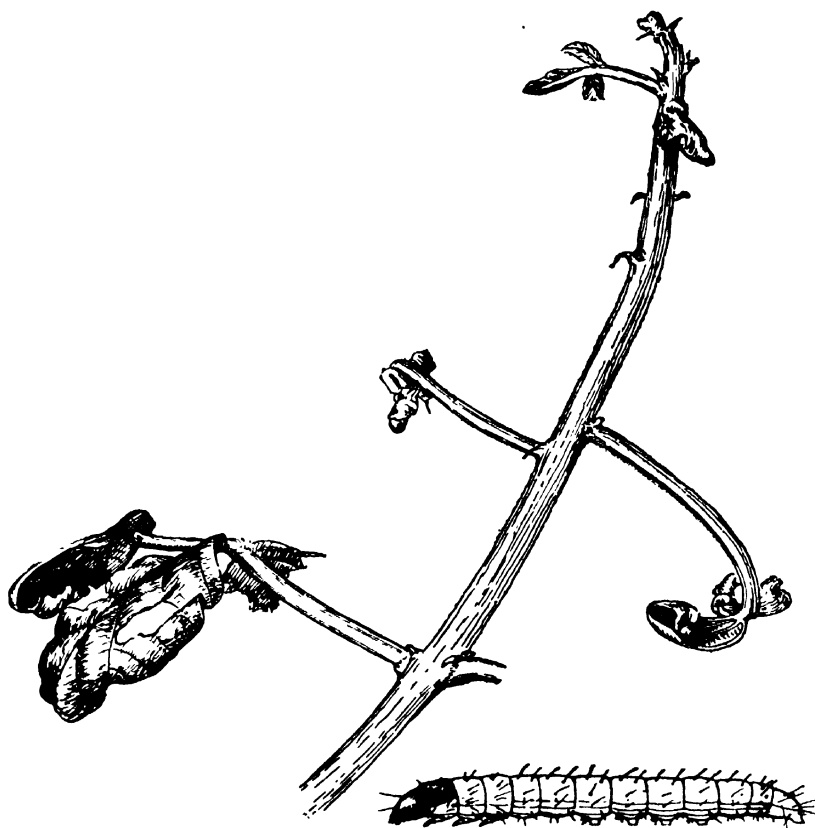
3. Moth  $\times$  9.

(The smaller figures show natural size.)



**PLATE XIII.**

**EUCOSMA CONCILIATA**, (Shoot of *Palas* attacked)  $\times 5$ .



California, Texas and Mexico, the West Indies, Brazil, Peru and Argentina. Within our limits it is known from Srinagar, Lyallpur, Muktesar (Kumaon), the Nilgiris, Coorg, and Ceylon.

The larval foodplants include *Althea rosea*, *Lavatera arborea*, *Malva parviflora* and other species, *Malvastrum spicatum*, *Malvaviscus drummondii*, *Kosteletzkya* sp., *Hibiscus esculentus*, *H. militaris* and *H. rosa-sinensis*. The larva feeds on the leaves, in seeds and on pods, and occasionally on the pollen of flowers. Structural figures of the larva and pupa are given by Heinrich (*Jl. Agric. Res.* XX, 822-823, tt. 102, 103, 105, 106, 108 : 1921).

It has been bred at Lyallpur from larvæ boring buds of Hollyhock (*Althea rosea*) and at Parbhani (Leccan) from larva in boll of *Abutilon indicum*.

#### EUCOSMA BALANOPTYCHA, MEYRICK.

(*Ent. Mem.* VI, 50.)

This species has been reared in the Malay Peninsula from larvæ folding the leaves of *Derris elliptica* (Corbett and Gates, Dept. Agric. F. M. S., Bull. 38, p. 9 : 1926).

#### EUCOSMA CERIODES, MEYRICK.

*Eucosma ceriodes*, Meyr., B. J. XIX, 607 (1909) ♂ ♀<sup>1</sup>; Meyr., Exot. Micr. III, 441 (1928)<sup>2</sup>.

A common species at Shillong where it seems to be attached to a wild *Rubus* but has not been bred. Also occurs in the Darjiling District and in Tonkin, where the larva has been noted by Duport on a "ronce" [bramble; *Rubus*] (de Joannis, *Ann. Soc. Ent. France*, XCIX, 717 : 1931), thus definitely confirming the above supposition as to larval foodplant, arrived at by observation of the moths in Shillong.

#### EUCOSMA CONCILIATA, MEYRICK. (PLATES XII AND XIII.)

(*Ent. Mem.* VI, 50.)

This was reared at Pusa originally from larvæ feeding on the flower-petals of *Palas* (*Butea frondosa*). It has since been noted that, after the flowers are over, these larvæ feed on the leaves and shoots. In July 1920 larvæ were found at Pusa attacking tender leaves and even rather older leaves appearing on new shoots, the green leaf-tissue being eaten and the attacked portions rolled and crumpled. Small leaves may be crumpled up entirely, appearing as a brown mass on the end of the long stalk, and in such cases the shoot itself is partly bored, more than one larva often being present. (Pusa Insectary Cage-Slip No. 2053.)

More larvæ were found at Pusa at the end of February 1931 on fallen petals of *Butea frondosa*, boring in at the base which is whitish and slightly fleshy. The

larva is about 11 mm. long and 1.5 mm. broad, cylindrical, tapering gradually posteriorly; head shiny reddish-brown or blackish-brown, its base concealed under prothorax; prothoracic shield chitinized, shiny reddish-brown or blackish-brown, with a median creamy-yellow dividing line; legs creamy-yellow, tinted light sepia; general colour of body creamy-yellow; segments distinct, bearing fine short hairs arising singly from minute chitinized pale-brown warts which are arranged trapezoidally on dorsum of first eight abdominal segments; anal plate chitinized, shiny, brown; prolegs short, stout, cylindrical, with brown hooklets arranged in complete circles; spiracles minute, circular, with clear centres and dark brown rims.

The pupa is about 5 mm. long and 1.5 mm. broad, cylindrical gradually tapering posteriorly, the wing-cases reaching to the end of the fourth abdominal segment; yellowish-brown; first abdominal segment distinct; second to seventh abdominal segments with two transverse rows of pointed spines, those of the anterior row the larger; eighth to tenth segments with only one row of spines; spines on anal segment well developed; spiracles oval, dark reddish-brown. The pupal period is six to ten days, according to temperature. The larvæ are extensively parasitized by a Braconid. (Cage Slip No. 2612.)

#### EUCOSMA CRITICA, MEYRICK.

(*Ent. Mem.* VI, 47-49.)

Also reared at Pusa from larva boring pods of *Crotalaria juncea*.

#### EUCOSMA DRYOCARPA, MEYRICK.

*Eucosma dryocarpa*, Meyr., *Exot. Micr.* III, 142 (1925) ♂ ♀ 1.

Bred in March at Dehra Dun from larvæ in acorns of *Quercus dilatata* obtained from Masuri (Forest Entomologist)<sup>1</sup>.

#### EUCOSMA HAPALOSARCA, MEYRICK.

*Eucosma hapalosarca*, Meyr., *Exot. Micr.*, III, 67-68 (1924) ♂ ♀ 1.

Reared in April from larvæ defoliating *Populus euphratica* in the Kureshia Forest, Multan (Beeson).<sup>1</sup>

#### EUCOSMA HYPSIDRYAS, MEYRICK.

*Eucosma hypsidryas*, Meyr., *Exot. Micr.* III, 140-141 (1925) ♂ ♀ 1.

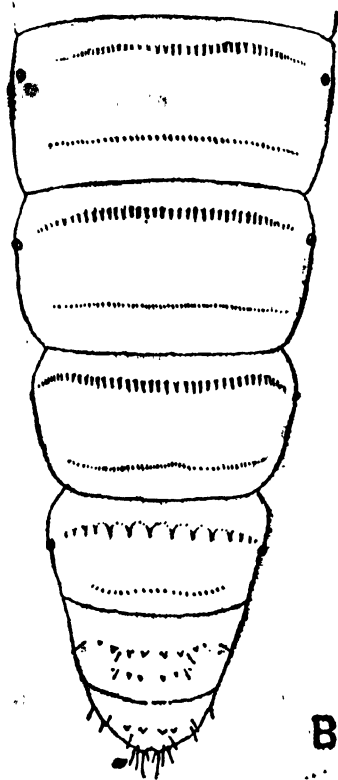
Bred in June from larvæ in buds of *Picea morinda* at Deoband (9,000 feet) Chakrata Division (Forest Entomologist)<sup>1</sup>.



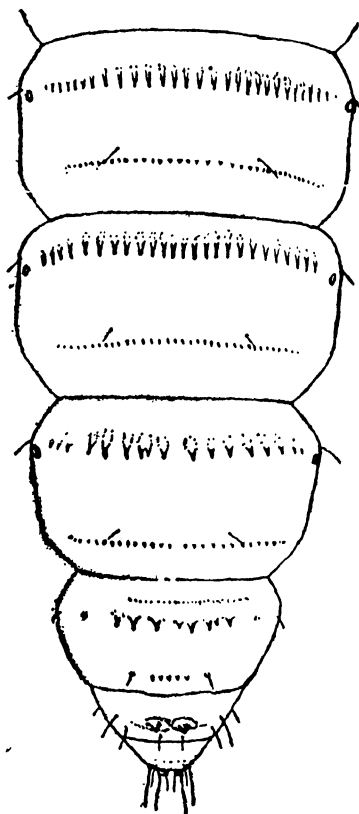


PLATE XIV.

ANAL EXTREMITIES OF PUPAE OF *BACTRA COMMENSALIS* AND *B. GRAMINIVORA*  
× 28.



*commensalis*



*graminivora*

*Bactra*

## EUCOSMA PHÆNOCROSSA, MEYRICK.

*Eucosma phænocrossa*, Meyr., Exot. Micr. III, 141-142 (1925) ♂ ♀<sup>1</sup>.

Bred in February in Travancore from larvæ on *Careya arborea* (Lecythidaceæ).<sup>1</sup>

## EUCOSMA STEREOMA, MEYRICK.

(Ent. Mem. VI, 51-52.)

*Eucosma stereoma* has also been reared at Pusa, between 29th July and 1st September 1922, from larvæ rolling leaves of *Acacia catechu*, binding together a few pinnae and living in the tunnel thus formed, and binding and feeding on the tenderer leaves.

The fullgrown larva is about 9 mm. long and 1.75 mm. broad, cylinder, tapering towards either extremity; head small, shining, yellow-brown, base retracted within prothorax, with a black mark above ocelli; prothorax smaller than following segments, shield light brown, shining, chitinated; legs pale yellowish or glassy white; general colour dark green or blackish, according to alimentary contents; segments distinct, with short fine single hairs arising from round dark-brown shining chitinated warts; spiracles rounded, minute, with yellowish centres and black rims; prolegs short, cylindrical, with complete circles of hooklets; anal plate smooth, pale-yellowish.

Pupation takes place in a white elongate-oval cocoon hidden amongst the leaflets. The pupa is about 5.5 mm. long and 1.5 mm. broad, brown, rather darker dorsally and lighter ventrally; second to seventh abdominal segments with two dorsal rows of small spines reaching to spiracles, spines of anterior row the larger; eighth to tenth segments with only anterior row of large spines; spiracles minute, brown, slightly raised. (Pusa Insectary Cage-Slip No. 2235.)

## EUCOSMA ZELOTA, MEYRICK.

(Ent. Mem. VI, 51, t. 12.)

This species has also been found at Srinagar, Murree, Masuri, and Ramgarh (Kumaon). At Ramgarh it was reared from a larva spinning up rose-leaves in the same way as originally described at Abbottabad.

## BACTRA COMMENSALIS, MEYRICK. (PLATE XIV.)

*Bactra commensalis*, Meyr., Exot. Micr. II, 522 (1922) ♂ ♀<sup>1</sup>.

*Bactra truculenta* [nec. Meyr.], Ghosh, Rept. Fourth Entl. Meeting, p. 126 [part], t. 23 f. c (1923).

Bred at Pusa from April to June from larvæ mining stems of *Cynodon dactylon* (Gramineæ). Also from Surat. Pupa without projecting anal papillæ (reduced

to dots), spines of segmental series very short and numerous, præanal series usually of 5 or 6 spines.<sup>1</sup>

When this was reared, it (together with *B. graminivora*) was taken to be *B. truculenta* but it was noted that the larva was green with the thorax dusky or smoky (instead of being pale yellowish with purplish thorax). Whether this colour-difference is individual or specific is not known definitely but it is supposed to be specific. The larva formed a silken cocoon lining the tunnel in the stem and pupated on 7th June 1920, the moth emerging on 11th June. The pupa had a green abdomen, with the head and thorax brown and the wing-cases brownish-yellow, and the anal processes were not so developed as in those of *B. graminivora* reared under C. S. 2021. (Pusa Insectary Cage-Slip No. 2021 A.)

The foodplant seems doubtful. No foodplant is noted in C. S. 2021 A, which was apparently prepared for the green larvæ collected with the yellow ones of C. S. 2021, which were noted as found in stems of "*Mootha*". Originally this was entered as *Cynodon dactylon*, but afterwards this name was struck out and *Cyperus rotundus* substituted, probably after determination of the foodplant by the Botanical Survey. The latter name appears to be correct.

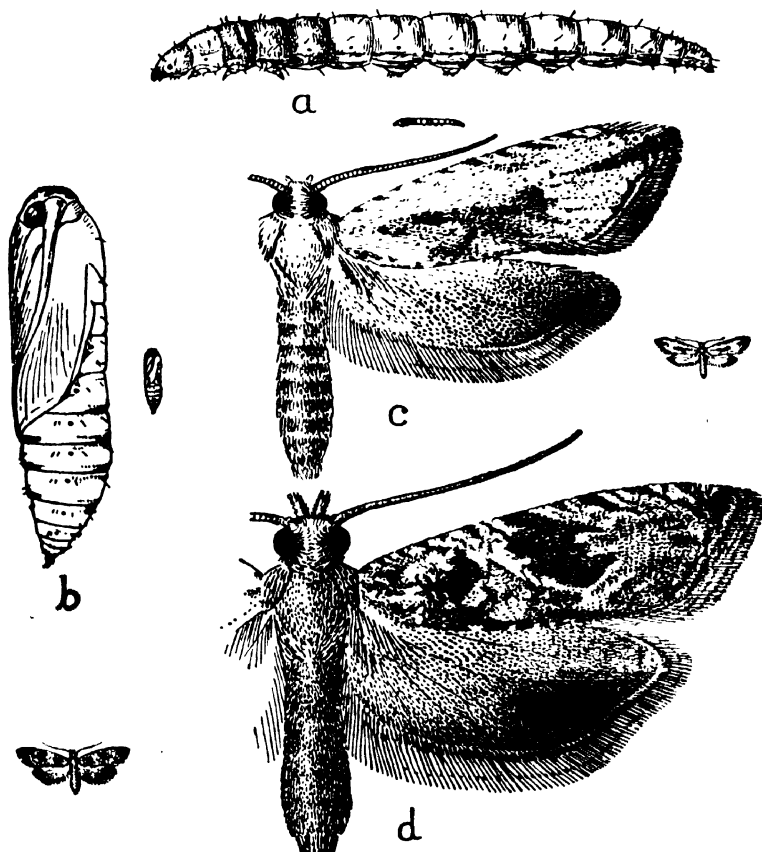
#### BACTRA GRAMINIVORA, MEYRICK. (PLATE XV.)

*Bactra graminivora*, Meyr., Exot. Micr. II, 521 (1922) ♂ ♀<sup>1</sup>.

*Bactra truculenta* [nec Meyr.] Ghosh, Rept. Fourth Entl. Meeting, p. 126 [part] t. 23, f. d, [? ff. a, b] (1923).

Bred at Pusa from April to June from larvæ mining stems of *Cynodon dactylon* (Gramineæ). Pupa with two distinct projecting anal papillæ (in both sexes); spines of segmental series twice as long and strong as in *commensalis*, rather less numerous, præanal series usually of 3 spines. The pupa of *B. truculenta* does not possess these papillæ (which are reduced to dots), the spines also are more as in *commensalis*<sup>1</sup>.

This species was reared together with *B. commensalis* and at the time these two species were not distinguished and were both supposed to be *B. truculenta*. It is not certain, therefore, if fig. *a* represents the larva of *graminivora* or of *commensalis*, but fig. *b* apparently shows the pupa of *graminivora*. Unfortunately the larva figured died before pupation but it was described as one of the yellow larvæ, in opposition to the green larvæ (*B. commensalis*). The original description of this larva, made on 31st May 1920, when it was about 7 mm. long, reads:—rather flattened, tapering slightly posteriorly; head brown-yellow, glossy, nearly as broad as prothorax; prothoracic shield brown-yellow; mesothorax, metathorax, and partially the first two abdominal segments purplish, the rest of the body pale yellow; anal plate yellow; spiracles round, with clear centres and brown rims; prolegs equally developed, with hooklets in a circle. This larva grew to 12 mm. and died before pupation.



a, b. (apparently) *Bactra graminivora*  $\times 8$ .

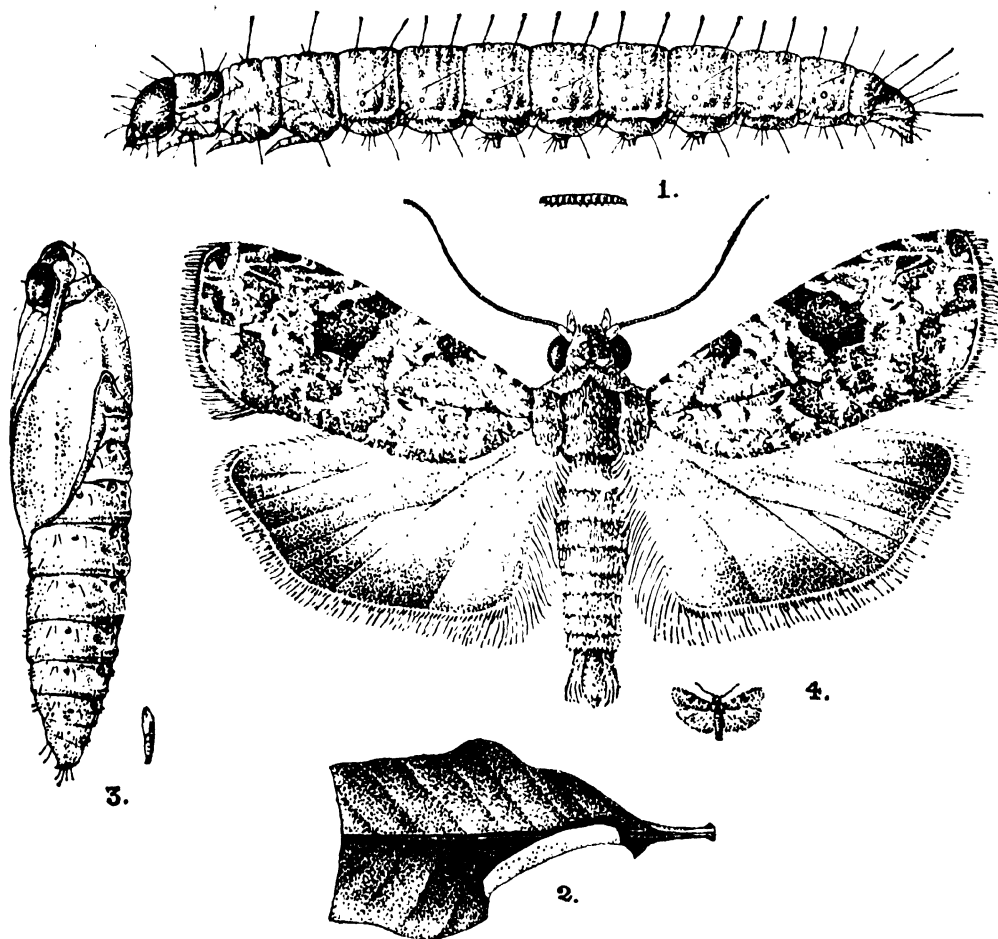
c. *Bactra commensalis*,  $\times 8$ .

d. *Bactra graminivora*,  $\times 8$ .





POLYCHROSIS CELLIFERA, MEYRICK.



- 1. Larva  $\times 9$ .
- 2. Cocoon  $\times 1\frac{1}{2}$ .
- 3. Pupa  $\times 9$ .
- 4. Moth  $\times 9$ .

(Smaller figures show the natural sizes.)

The pupa was described as 5 to 7 mm. long, cylindrical, pale brownish-yellow, before emergence turning grey-brown with the wing cases black ; third to eighth abdominal segments with two dorsal transverse rows of spines, the anterior row composed of comparatively large straight spines directed posteriorly, the posterior row of very minute spines ; ninth abdominal segment with a single row of large spines whose tips (or of at least two) are recurved anteriorly ; anal area rounded, with a pair of small pyramidal processes surmounted with hairs. (Pusa Insectary Cage-Slip No. 2021.)

As noted under *B. commensalis*, the foodplant was apparently *Cyperus rotundus* and not *Cynodon dactylon*.

Another larva, apparently full-grown, was collected at Pusa in stem of *Cyperus rotundus* on 8th June 1920 and was described as about 15 mm. long by 1.5 mm. broad, elongate, slender, cylindrical, tapering very slightly posteriorly ; head glossy black, slightly smaller than prothorax, which has a dark-grey shield divided medially ; colour uniformly rather glossy pale-yellow, including legs and prolegs ; spiracles small, rounded, with clear centres and brown or black rims ; a tracheal tube visible through the skin and connecting the spiracles ; prolegs equally developed, with hooklets in complete circles. Pupai period about five days in June. (Pusa Insectary Cage-Slip No. 2032.)

#### BACTRA TRUCULENTA, MEYRICK.

(*Ent. Mem.* VI, 53.)

*B. truculenta*, whose larva bores in the stems of *Cyperus rotundus*, is known from Ceylon (Anuradhapura and Kegalle), India (Palnis, Coimbatore, N. Coorg, Andamans, Kharaghoda, Peshawar, Pusa), Iraq, Java, Celebes, Cambodia and the Philippines, from which last it has been introduced into the Hawaiian Islands to control Nut-grass.

#### POLYCHROSIS ACANTHIS, MEYRICK.

*Polychrosis acanthis*, Meyr., *Exot. Micr.* 11, 348 (1920)<sup>1</sup> ; Fletcher, *Ind. Agric. Ent. Mem.* VI, 200, t. 60 (1921)<sup>2</sup>.

Reared again at Pusa from larva boring topshoots of *Justicia gendarussa* ; larva was collected 16th November, pupated 25th November, and emerged 5th December 1921.

#### POLYCHROSIS CELLIFERA, MEYRICK. (PLATE XVI.)\*

(*Ent. Mem.* VI, 53.)

Also reared at Pusa on 12th July 1924 from a larva found boring fruits of *Eugenia jambolana*. Other larvæ were found at Pusa in April and May 1931, rolling tender

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\* This species is now placed in the genus *Argyroproctæ*.



leaves of *Eugenia jambolana* longitudinally, the two margins of the leaf being tied together by silken threads. The larva lives inside the folded leaf, nibbling the green tissue, its frass accumulating within the shelter.

The fullgrown larva is about 12·3 mm. long and 1·25 mm. broad, cylindrical, tapering gradually posteriorly; head creamy-yellow, with a small black spot posteriorly on the base of the cheek; prothoracic shield chitinated, glossy, creamy-yellow; legs glassy-white, apical segments slightly yellowish, claws brown; general colour of body dull or dark green; segments distinct, bearing fine median hairs arising singly from slightly chitinated circular tubercles arranged trapezoidally, the anterior tubercles being closer together on first to seventh abdominal segments, but the posterior trapezoidals being closer on the eighth segment; prolegs short, cylindrical, glossy, light-green, with complete circles of brown hooklets; spiracles circular, with clear centres and narrow dark-brown rims; anal plate glossy. Prior to pupation the larva becomes yellow-green or leaf-green in colour.

Pupation takes place in a thin cocoon which may be formed in a leaf of the food plant by cutting the margin and turning back the edge of the leaf. The pupa is about 7·5 mm. long and 1·75—2 mm. broad, cylindrical, tapering gradually posteriorly; yellowish-brown, thorax and ventral surface yellowish-green; wing-cases reaching anterior margin of fourth abdominal segment; first abdominal segment smooth, dorsally slightly concave; second to eighth abdominal segments each with a subdorsal broad, black, chitinated, rimmed pit, and with well-developed anterior and smaller posterior transverse setæ; ninth segment with small setæ; tenth segment brown, broad, tapering posteriorly, with a few cremastral hooks and a few minute dorsal setæ; spiracles oval, narrowly rimmed with brown, that on eighth abdominal segment being closed. The pupal period is five or six days in April-May. (Pusa Insectary Cage-Slip No. 2637.)

#### POLYCHROSIS EPHIPPIAS, MEYRICK. (PLATE XVII.)

*Chrosis ephippias*, Meyr., B. J. XVII, 731 (1907)<sup>1</sup>.

*Polychrosis ephippias*, Meyr., B. J. XIX, 587 (1909)<sup>2</sup>; Meyr., Ann. Transv. Mus. VI, 11 (1918)<sup>3</sup>; Meyr., T. E. S. 1923. 547 (1924)<sup>4</sup>.

*Polychrosis ephippias* is common and well-distributed in the Indian Region, being known from Puttalam,<sup>1</sup> Maskeliya<sup>1</sup>, Peradeniya, Kandy and Madulsima in Ceylon, from Bellary, Bombay<sup>1</sup>, Bandra, Bassein Fort, Chapra, Pusa, Kumaon, Kurseong, Gangtok, and the Khasi Hills in India, and also from Java, Tonkin, the Philippines, Natal<sup>3</sup> and Rodriguez<sup>4</sup>.

Larvæ were found at Pusa on 26th September 1921 boring green stems of *Commelina bengalensis*, whose leaves consequently dry up. The larva is about 10 mm. long and 1·5 mm. broad, cylindrical, tapering very slightly posteriorly; head jet black, shiny, nearly as broad as prothorax, which is also jet-black with a shield extending to spiracles and divided medially by an obscure yellowish line; first



## EXPLANATION OF PLATE XVII.

*Polychrosis ephippias*, Meyrick.

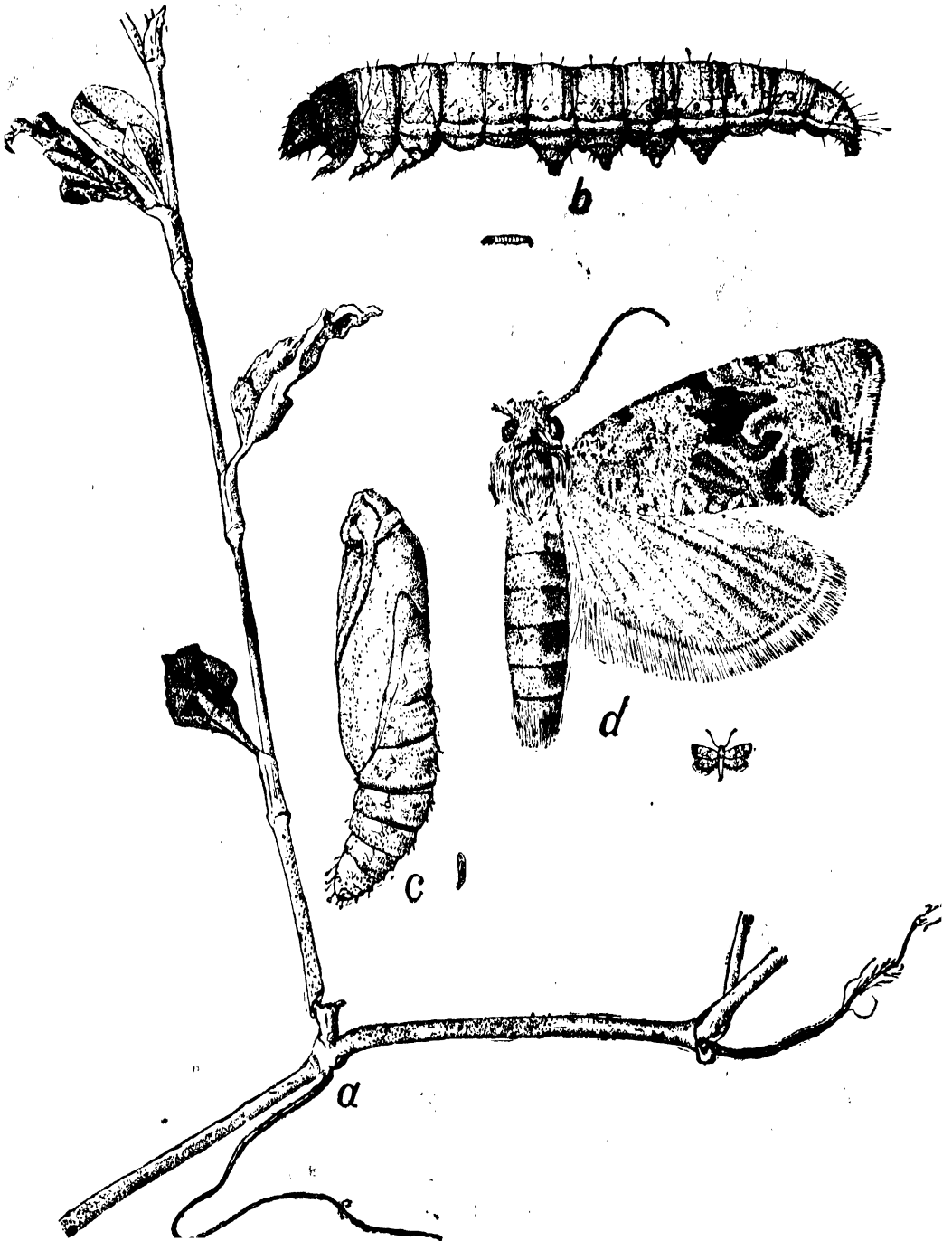
*a.* The stem showing the base cut by larva.

*b.* The larva  $\times 12$ .

*c.* The pupa  $\times 12$ .

*d.* The moth  $\times 12$ .

(Smaller figures show the natural sizes.)

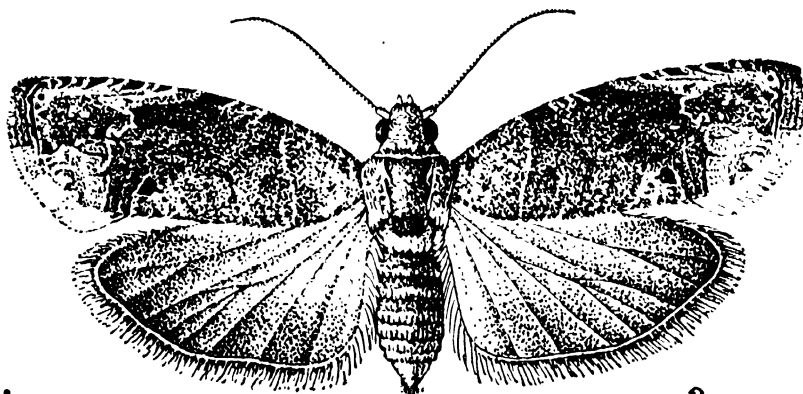
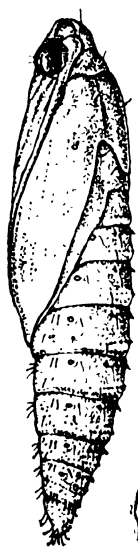
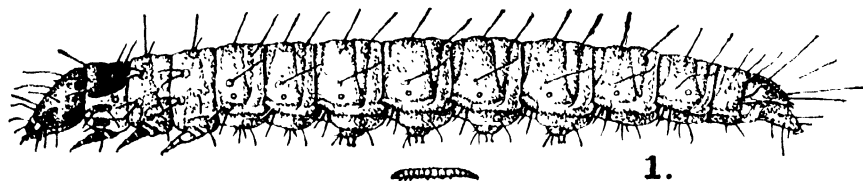


POLYCHROSIS EPHIPPIAS, MAYRICK.





ARGYROPOLOCE APROBOLA, MEYRICK.



- 1. Larva  $\times 9$ .
- 2. Pupa  $\times 9$ .
- 3. Moth  $\times 7$ .

(The smaller figures show the natural sizes).

pair of legs also black and glossy ; ventral surface of prothorax greenish tinged blackish ; other segments leaf-green, second and third pairs of legs yellowish ; segments not very distinct, with short, fine hairs ; abdominal segments with two ill-defined subsegments posteriorly ; prolegs short, cylindrical, with complete circles of hooklets ; spiracles rounded, with black rims.

When full-fed, the larva emerges from the stem and pupates in a flimsy cocoon inside a folded leaf. The pupa is about 6 mm. long by 1.5 mm. broad, brownish-green ; third to seventh abdominal segments with two dorsal transverse rows of brown spines, those of anterior row the larger ; eighth and ninth segments with only one row of larger spines ; second segment with posterior row of smaller spines ; spiracles raised, prominent, oval, brown. The pupal period is about six days. (Pusa Insectary Cage-Slip No. 2195.)

#### LOBESIA FETIALIS, MEYRICK.

*Polychrosis fetialis*, Meyr., Exot. Micr. II, 346 (1920) ♂<sup>1</sup> ; Fletcher, Ind. Agric. Ent. Mem. VI 53 (1921)<sup>2</sup>.

*Lohesia aeolopa* [nec Meyr.], Fletcher, Ind. Agric. Ent. Mem. VI, pp. 54 [partim], 200, t. 61 f. 1 (1921)<sup>3</sup>.

This species is a *Lobesia*, not a *Polychrosis*, and is the species referred to, as having been reared from *Leucas cephalotes*, in the last paragraph under *L. aeolopa*. The female moths of this species and of *L. aeolopa* seem to be indistinguishable, but the males are readily separated.

Specimens that appear to be *L. fetialis* have also been reared at Pusa from larvæ feeding on flowers of *Averrhoa carambola* in July 1929 and from larvæ feeding on dry flowers of Soapnut (Hindi *Ritha*). The latter larva was described as purple in colour, head brown, glossy, thoracic plate glossy dirty-brown with whitish anterior margin, hairs on segments short and fine, arising singly from yellow warts. Pupation in a flimsy white cocoon. Pupa about 4.75 mm. long and 1.25 mm. broad, dark brown, head and prothorax lighter ; second to eighth abdominal segments each with two dorsal transverse rows of spines, those of anterior row longer, both rows on second segment smaller and fewer ; ninth segment with one row of spines ; wing-cases reaching apex of fourth segment, glossy. (Pusa Insectary Cage-Slip No. 2470.)

#### ARGYROFLOCE APROBOLA, MEYRICK. (PLATE XVIII.)

(Ent. Mem. VI, 57-58.)

*Argyrofloce aprobola* has since been reared at Pusa from larvæ rolling leaves of *Legerstræmia flos-reginæ*, on flowers of *Loranthus*, leaf of *Salix tetrasperma* and of *Cassia tora*, and on tender leaves of *Schleichera triguga*. We also have specimens from Nagpur said to have been reared from mango shoots and on guava, but these



records require confirmation. This species is common and widely-distributed throughout India and Ceylon, where it is found mostly in the Plains, although it is known from Madulsima and Pundaluoya in Ceylon and from Shillong in the Khasi Hills. We seem to have no record of its occurrence in Burma, although it is doubtless to be found there. It is a species which is easily transported with litchi, mango or rose-trees, and, with its wide range of foodplants, is easily able to adapt itself to new localities, where it may well develop into a pest. Outside of India, it is known from the Chagos Islands, Seychelles and Amirante Islands, Java, Tonkin, Formosa, New Guinea, Queensland, Tonga, Samoa, Tahiti, Society Islands and Austral Islands.

#### ARGYROPLOCE CODONECTIS, MEYRICK.

*Argyroploce codonectis*, Meyr., Exot. Micr. III, 339 (1927) ♂ ♀ <sup>1</sup>.

Described from Dibidi, in North Coorg, and from Kuala Lumpur, in the Malay Peninsula. Bred at Kuala Lumpur from larvæ feeding on shoots and leaves of *Eugenia malaccensis* and *E. aquea* (Myrtaceæ)<sup>1</sup>. It occurs also at Port Blair (Andamans).

#### ARGYROPLOCE DISCANA, FELDER.

*Tortrix* ? *discana*, Feld., Reise Novara, Het., t. 137 f. 41 (1874).<sup>1</sup>

*Argyroploce discana*, Meyr., Proc. Linn. Soc. N. S. W. XXXVI, 280 (1911)<sup>2</sup>; de Joannis, Ann. S. E. France XCIX, 720 (1931)<sup>3</sup>.

*A. discana* has been found at Ganesh-Gudi, in North Kanara, but otherwise does not seem to have been noted within our limits. It may be overlooked and confused with the somewhat similar *A. leucaspis*, Meyrick. Outside of India, it occurs in Java, China, Hainan, Tonkin, Moluccas and the Solomon Islands. In Tonkin the larva has been found rolling young litchi leaves.<sup>3</sup>

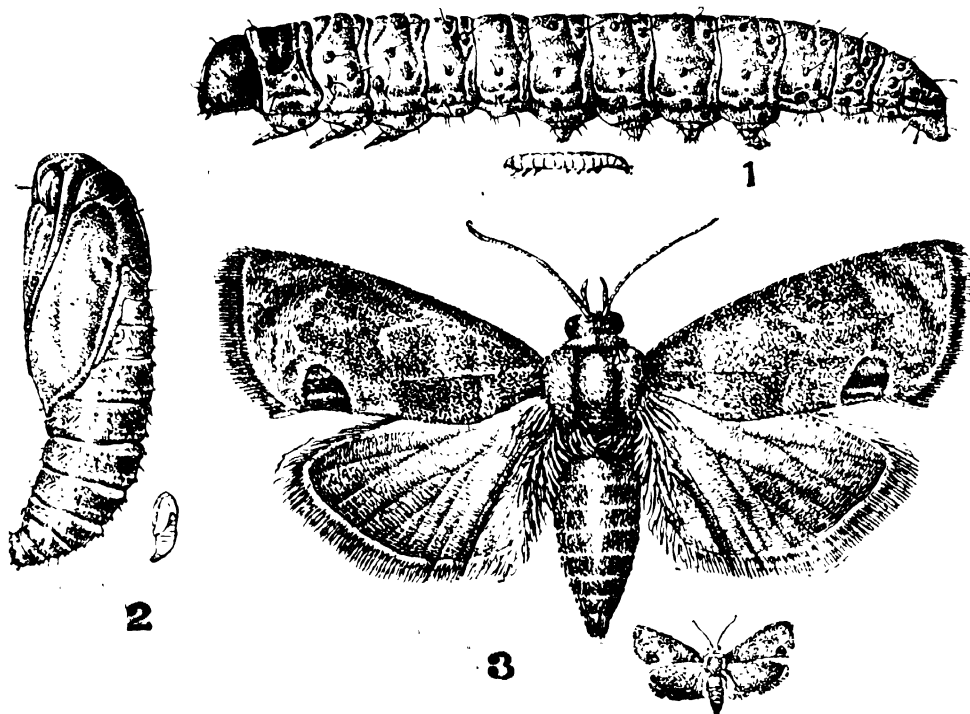
#### ARGYROPLOCE ENCARPA, MEYRICK.

*Argyroploce encarpa*, Meyr., Exot. Micr. II, 349 (1920)<sup>1</sup>; de Joannis, Ann. S. E. France XCIX, 718 (1931)<sup>3</sup>.

This was described from specimens taken off the coast of Ceylon and boring in fruit of Tangerine orange at Calcutta<sup>1</sup> (imported). It has since been recorded from Tonkin where the larva was feeding on litchi seeds.<sup>2</sup> It was also bred at Pusa on 16th March 1928 from a larva webbing *ber* (*Zizyphus jujuba*) fruit with leaf. Mr. Meyrick notes (*in litt.*) that probably *lasiandra*, Meyr., is the male of this.



ARGYROPOLOCE ILLEPIDA, BUTLER.



1. Larva  $\times 6$ .  
2. Pupa  $\times 6$ .  
3. Moth  $\times 4\frac{1}{2}$ .

(The smaller figures show the natural sizes.)

## ARGYROPOLOCE EROTIAS, MEYRICK.

(Ent. Mem. VI, 59.)

*Argyroploce erotias* has since been reared at Pusa from larvæ on flowers of *Averrhoa carambola*, *Mallotus repandus*, and *Bauhinia purpurea*, from a pupa found on leaf of *Guazoma tomentosa*, and from larvæ on dry flowers of *Sapindus mukorossi*.

This is another species which is easily transported with mango plants. Besides the localities previously given, it is known from Java and Tonkin, from numerous localities in Ceylon, and from Coorg, Bangalore and Sikkim.

## ARGYROPOLOCE HERBIFERA, MEYRICK.

*Argyroploce herbifera*, Meyr., B. J. XIX, 603-604 (1909) ♂ ♀<sup>1</sup>; Meyr., Exot. Micr. III, 604 (1930)<sup>2</sup>.

Originally described from Maskeliya<sup>1</sup> (Ceylon) and the Khasi Hills<sup>1</sup>, this species has since been bred in Java from larvæ rolling leaves of *Cinnamomum camphora* (Verbeek)<sup>2</sup>.

## ARGYROPOLOCE HOPLISTA, MEYRICK.

*Argyroploce hoplista*, Meyr., Exot. Micr., III, 340-341 (1927) ♂ ♀<sup>1</sup>.

Described from Bombay, Belgaum and Sumatra (Sinabaeng; 3,300 feet). Bred in Sumatra from *Barleria* sp. (Fulmek).<sup>1</sup>

## ARGYROPOLOCE ILLEPIDA, BUTLER. (PLATE XIX.)

(Ent. Mem. VI, 55-57.)

The egg, larva and pupa have been described by Swezey (*Proc. Hawaii Ent. Soc.* II, 14-15: 1908) in Hawaii, where the larva feeds in pods of *Acacia farnesiana*, *Koa* pods and litchi seeds. To the recorded distribution should be added Sokotra, Java, Tonkin, China and Fiji, but the record of this species from South Africa (Ent. Mem. VI, 56) should be deleted, as it applies to the South African *A. peltastica*, Meyr.; the Seychelles specimen was also presumably *peltastica*.

The larva is parasitized by *Euagathis cryptophlebiæ*, Viereck, as recorded by T. V. Ramakrishna Ayyar (*Report Fourth Entl. Meeting*, p. 364: 1921).

It has also been reared at Pusa from a pupa in pod of *Parkinsonia aculeata* and from larvæ boring pods of *Bauhinia purpurea* and in small, fallen fruits of Bael (*Aegle marmelos*).

The life history has been described previously but opportunity is taken to add a better figure.

## ARGYROPOLOCE LACUNANA, DUPONCHEL.

*Sericoris lacunana*, Dup., Lep. France, Suppl. IV, 425-426, t. 84, f. 5 (1842)<sup>1</sup>;

Barrett, Lep. Brit. Isds. XI, 55-57, t. 477 ff. 3, 3 *a-b* (1907)<sup>2</sup>.

*Argyroploce lacunana*, Kennel, Pal. Tortr. pp. 411-413, f. 30, t. 17, ff. 23-25 (1916)<sup>3</sup>; Meyr., Rev. Handb., p. 576 (1928)<sup>4</sup>.

This species has been found within Indian limits at Gulmarg (Kashmir, 8,500 ft.). It is widely distributed in Northern and Central Europe, Asia Minor, Siberia, Japan, North, West and East China. The larva has been found on various low plants, *Salix*, *Rubus*, *Betula*, *Spiraea*, *Calla*, *Mentha*, *Matricaria*, *Urtica*, *Conyza*, *Lamium*, *Cirsium*, *Anthriscus*, *Chrysanthemum* and *Ranunculus*. The larva is described by Barrett as "cylindrical, rather elongated, very active, most puzzling from its great variability; smoky brown, smoky black, green or liver colour with head and plates shiny black; or else pale-grey, dull white or pale yellow with the head and plates light brown, or with the head and dorsal plate black and the anal plate brown, or yellow with a brown dot. May and June in the young shoots of almost all kinds of herbaceous plants and shrubs, feeding also in many instances in the blossoms and the joined or drawn together leaves, also on birch and other trees. The variations in the colour in the larva seem in many instances to be influenced by their food; but have no bearing on the perfect insect—all the most singular forms of the larva producing ordinary and typical moths. Pupa shining, dark brown or black-brown. In a silken cocoon spun up anywhere except in the larval habitation"<sup>2</sup>.

NOTE.—The correct name of this species seems to be doubtful; it may be *cervana*, Scopoli 1763=*decussana*, Fb. 1775=*lacunana*, Schiff. 1776. Synonyms of *lacunana*, Dup., are *micana* [nec Hb.], Hw 1811=*obsoletana*, Steph. 1834=*urticana* [nec. Hb.], Dup. 1835=*monetana*, Treits. 1835=*decussana*, Zett. 1840=*herbana*, Gn. 1845=*rooana*, de Graaf 1861=*hofmanniana*, Teich 1890 (var.)=*cacuminana*, Kennel 1901. The exact synonymy requires to be worked out, but I leave it for the present.

## ARGYROPOLOCE LASIANDRA, MEYRICK.

*Argyroploce lasiandra*, Meyr., B. J. XIX 592 (1909)<sup>1</sup>; Meyr. Exot. Micr. III 143 (1925)<sup>2</sup>.

Originally described from Trincomali,<sup>1</sup> this species has since been bred in Fiji from hypocotyl of seedlings of *Bruguiera rheedii* (a mangrove).<sup>2</sup> It is probable that *A. encarpa*, Meyr., is the female of this.

## ARGYROPOLOCE LEUCASPIS, MEYRICK.

(*Ent. Mem.* VI 60, t. 13 f. 2).

Also reared at Pusa from larvæ rolling leaves of Soapnut (*Ritha*: Hindi) (C. S. 2459).

## ARGYROPOLOCE MORMOPA, MEYRICK.

*Platycephalus mormopa*, Meyr., B. J. XVII 136 (1906).<sup>1</sup>

*Argyroplote mormopa*, Meyr., Sarawak Mus. J1. III 152 (1926)<sup>2</sup>.

Bred at Quilon, Travancore, in July 1921, from larvæ on *Jambora vulgaris* (R. M. Pillai's cage slip 440).

Known from Maskeliya,<sup>1</sup> in Ceylon, from Quilon and Karwar, and also from Borneo<sup>2</sup> and Tonkin.

## ARGYROPOLOCE PURPURISSATANA, KENNEL.

*Penthina purpurissatana*, Kennel, Iris XIII 252-253 (1900) ♂<sup>1</sup>.

*Olethreutes purpurissatana*, Rebel, Cat. Pal. Lep. II 261, No. 1886 *bis* (1901)<sup>2</sup>.

*Argyroplote archimediæ*, Meyr., Exot. Micr. I. 63 (1912) ♂♀<sup>3</sup>.

*Semasia purpurissatana*, Kennel, Pal. Tortric. p. 478, t. 19 f. 2 (1916) [redescrip.]<sup>4</sup>

*Argyroplote purpurissatana*, Meyr., Exot. Micr. III 604 (1930)<sup>5</sup>.

*A. purpurissatana* is known from Sutschan (<sup>1</sup>, <sup>4</sup>) in South Ussuri, from Hong-kong<sup>3</sup>, and, within our limits, from Pusa, where a single specimen has been taken, and from Peradeniya, where it was bred in January from larvæ in spun leaves of *Litsea glutinosa* (Lauraceæ) (Hutson)<sup>5</sup>.

## ARGYROPOLOCE RHYNCHIAS, MEYRICK.

(*Entl. Mem.* VI 61).

*A. rhynchias* has been found to occur at Bombay and is also known from the Marquesas, Society and Austral Islands in the Pacific.

## ARGYROPOLOCE TONSORIA, MEYRICK.

(*Entl. Mem.* VI 61).

*Argyroplote tonsoria* is also known to occur in Java and in the Andaman Islands, where it has been taken on Mount Harriet (1,200 feet) and bred at Port Blair from larvæ boring topshoots of *Barringtonia racemosa*.

## ARGYROPOLOCE TROPHIODES, MEYRICK.

*Eucosma trophiodes*, Meyr., B. J. XVIII 613 (1908) ♂♀<sup>1</sup>.

*Argyroplote [trophiodes]*, Meyr., B. J. XIX 592 (1909)<sup>2</sup>.

This species is known from Ceylon (Maskeliya<sup>1</sup>, Madulsima<sup>1</sup>, Diyatalawa<sup>1</sup>, Hakgala<sup>1</sup>, Pattipola<sup>1</sup>, Nuwara Eliya<sup>1</sup>, and Namunakuli) from India (Nilgiris,<sup>1</sup> Coorg,<sup>1</sup> and Khasi Hills<sup>1</sup>) and from Java. Mr. Meyrick informs me (*in litt.*) that it has been reared in Java from larvæ in spun shoots of *Glycine soya*.

## ENARMONIA AMPHILECTA, MEYRICK, (PLATE XX).

*Laspeyresia amphilecta*, Meyr., Exot. Micr. III 145 (1925) ♀<sup>1</sup>.

Bred at Pusa in July from a larva boring shoot of *Cordia myxa*.<sup>1</sup>

Larvæ were found at Pusa on 14th July 1920 boring in shoots of *Cordia myxa*. The larva usually enters at the axil of a topleaf and the bored portion swells and forms a slight elongate gall, the larval frass usually forming a small mass around the hole through which it is ejected. Sometimes the gall formation does not extend throughout the bored portion; the top of the shoot may be swollen, whilst the larva has bored down several inches from the top. The growth of affected shoots is checked to some extent but after some time they seem to recover and outgrow the attack. Examination of old shoots reveals swollen portions which have burst longitudinally, the corroded interior being thus exposed and covered with a corky growth. The larva, almost full-grown, is about 8 mm. long and 1.5 mm. broad, cylindrical, tapering slightly posteriorly; head dark brown, shiny; prothoracic shield dark brown, divided medially; colour of body, including legs and prolegs, pale yellow; skin rather glossy; warts rather small, greyish; prolegs equally developed; spiracles small, rounded, brown, connected by a whitish tracheal tube visible through the skin.

Pupation takes place within the bored stem, the larva preparing a hole of exit whose mouth is kept closed with a thin layer of bark. Pupa about 6 mm. long by 1.75 mm. broad, cylindrical, tapering slightly towards either extremity; brownish yellow; second to seventh abdominal segments with two dorsal transverse rows of spines, those of anterior row the larger, but on second segment both rows minute; eighth and ninth segments with one row of scattered large spines; anal extremity rounded, dorsal edge with six spines rather upcurved; spiracles with prominent brown rims. (Pusa Insectary Cage-Slip No. 2057).

## ENARMONIA ANTICIPANS, MEYRICK.

*Laspeyresia anticipans*, Meyr., Exot. Micr. III 342 (1927) ♀<sup>1</sup>.

Bred at Pollachi (Coimbatore District) in August from a larva webbing flowers of *Mangifera indica* (Menon)<sup>1</sup>.

## ENARMONIA CHELIAS, MEYRICK.

*Laspeyresia chelias*, Meyr., B. J. XVIII 145-146 (1907) ♂<sup>1</sup>; Ann.

Transv. Mus. II 229 (1911)<sup>2</sup>; Meyr., Exot. Micr. III 342 (1927)<sup>3</sup>

*E. chelias* is known from Ceylon (Maskeliya<sup>1</sup>, Hambantota, Haldummulla and Pattipola), from Karwar in N. Kanara, and from Pretoria<sup>2</sup> in the Transvaal. It was bred in August at Karwar from a larva feeding among spun leaves on new shoots of *Ochna* (Ochnaceæ); pupa in a compact cocoon streaked reddish (Maxwell)<sup>3</sup>.





EXPLANATION OF PLATE XX.

*Enarmonia amphilecta*, Meyrick.

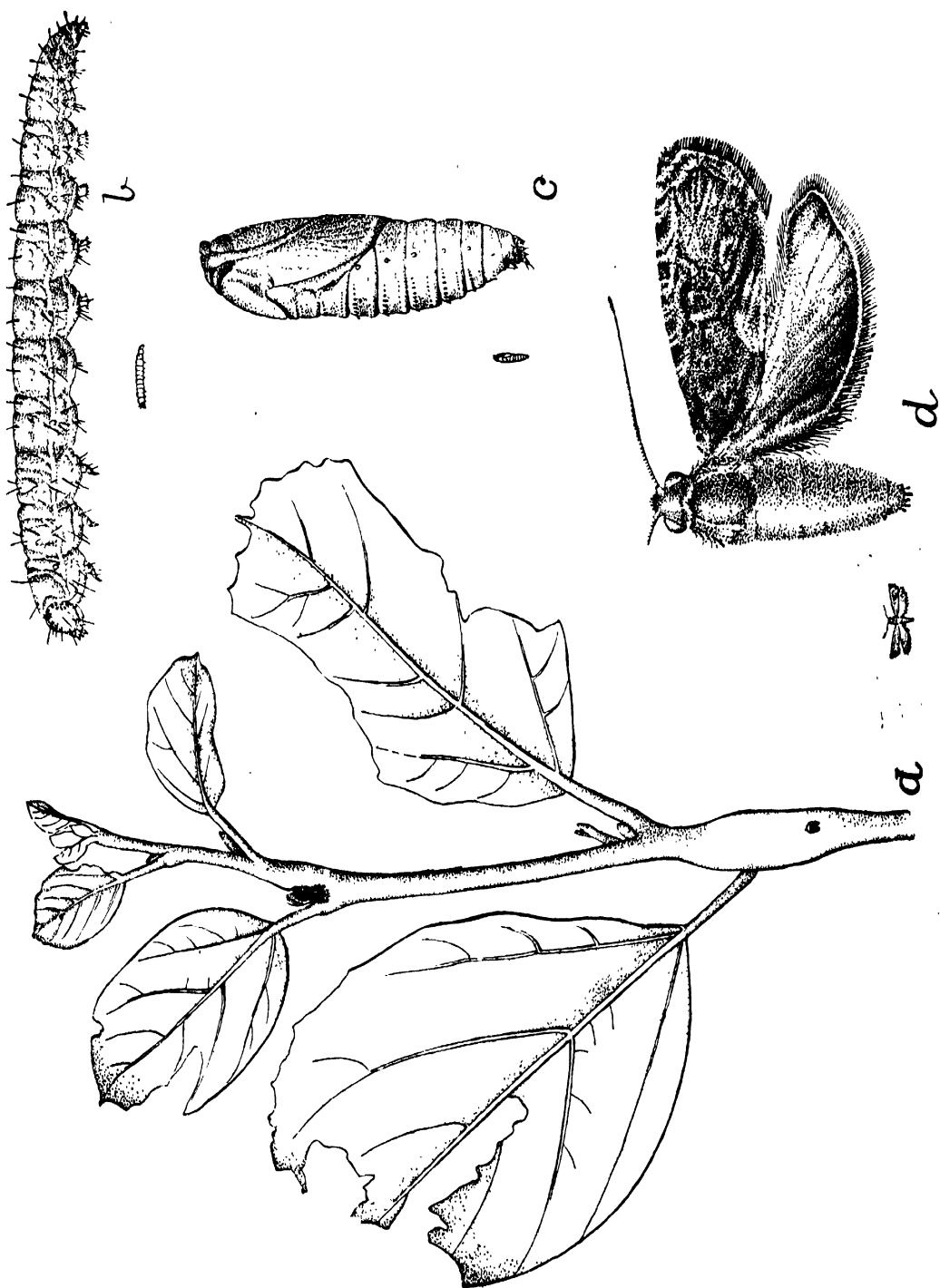
*a.* Twig showing bored portion swelled up.

*b.* Larva  $\times 10$ .

*c.* Pupa  $\times 10$ .

*d.* Moth  $\times 10$ .

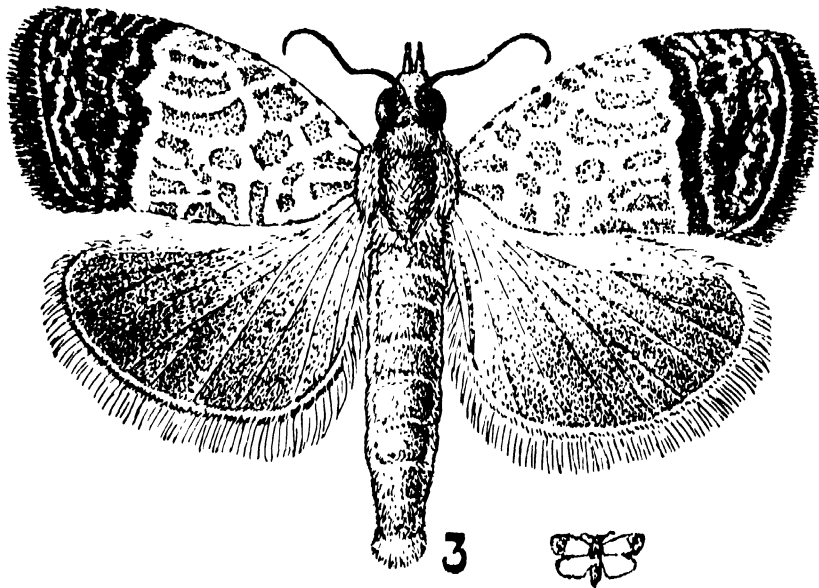
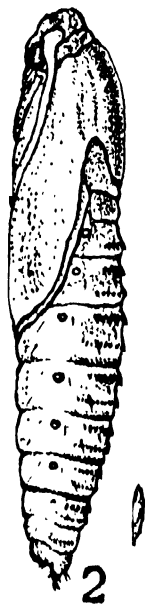
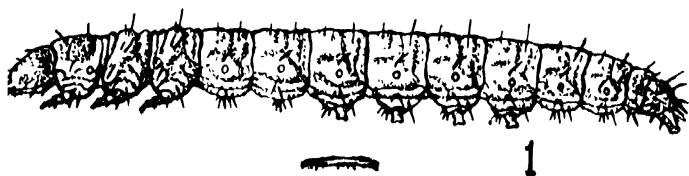
(Smaller figures show natural size.)







ENARMONIA KOENIGIANA, FABRICIUS.



- 1. Larva  $\times 9$ .
- 2. Pupa  $\times 9$ .
- 3. Moth  $\times 9$ .

(Smaller figures show natural size.)

## ENARMONIA DELINEANA, WALKER.

*Grapholitha delineana*, Wlk., Cat. XXVIII 389-390 (1863)<sup>1</sup>.

*Grapholitha apicatana*, Wlk., Cat. XXVIII 390 (1863)<sup>2</sup>.

*Grapholitha tristriatana*, Pag., Zoologica XXIX 224 (1900)<sup>3</sup>.

*Laspeyresia isacma*, Meyr., B. J. XVIII 144 (1907)<sup>4</sup>.

*Laspeyresia delineana*, Meyr., P. Z. S. 1908. 721 (1908)<sup>5</sup>.

A widely-distributed species, known from China<sup>1, 2, 5</sup>, Bismarck Islands<sup>3</sup>, Transvaal<sup>5</sup>, Mauritius,<sup>5</sup> and, within our limits, from Shillong and Cherrapunji (Khasi Hills), the Andamans, and Pusa.

At Pusa it was reared on 2nd January 1929 from a larva found rolling *Polygonum* leaves.

## ENARMONIA JACULATRIX, MEYRICK.

(Entl. Mem. VI 64-65).

According to Howlett (*Ind. Ins. Life*, p. 598 : 1909) the small Bombylid fly referred to by Lefroy in the note previously quoted, is *Geron argentifrons*, Brunetti ; but it is possible that the Bombylid is a hyperparasite of the Hymenopterous parasite which attacks these larvæ.

The main emergence of the moths is usually about the first week in March, when small swarms may be seen dancing on the wing in the early morning until about 9 A.M.

Also occurs at Dehra Dun, Gurdaspur (Punjab) and probably whenever *Dalbergia sissoo* grows in Northern India.

## ENARMONIA KOENIGIANA, FABRICIUS (PLATE XXI).

*Pyrallis kœnigiana*, Fb., Syst. Entom., p. 653 (1775)<sup>1</sup>.

*Laspeyresia kœnigiana*, Fletcher, Ind. Agric. Ent. Mem. VI 62 (1921)<sup>2</sup>.

This species was originally collected by Kœnig in "India orient," by which we are to understand the Madras Presidency and probably Tranquebar. We know it from Coimbatore, Siruguppa (Coorg), N. Kanara, Belgaum, Surat, Karachi, Pusa, Chapra (N. Bihar), Purulia, from Minbu and Tatkon in Burma, Trincomali (Ceylon), Shanghai, Hainan, Tonkin, Kei Islands (New Guinea) and Brisbane (Queensland).

Some specimens (*e.g.*, from South India and Burma) have the forewing bright fulvous, whilst in others (mostly from North India) the fulvous ground-colour is marbled lighter and darker. At Pusa both forms may be bred at the same time and both seem to form only one species.

Larvæ were found at Pusa on 23rd November 1920 and on 11th July 1929, in rolled or superimposed leaves of *Nîm* (*Melia azadirachta*), nibbling the surfaces of the leaves. The larva is about 12 mm. long and 1.5 mm. broad, elongate, cylindrical, tapering slightly posteriorly ; head yellowish-brown, glossy, partly retracted

under prothorax; prothoracic plate brown, not reaching pale yellowish anterior margin of segment; legs pale greenish-yellow; general colour dull greenish-yellow; segmental interstices not well marked; setal hairs minute, brown, single; prolegs pale yellowish, with complete circles of hooklets.

When young, the larva bores the tender topshoots of its foodplant and at that stage is yellowish-white with black head and prothoracic plate. Sometimes, the larva continues as a shoot-borer until it is full-grown, but most larvæ seem to be leaf-feeders.

Pupation takes place in a white cocoon formed in a fold made by rolling the margin of a leaf. The pupa is about 5-7 mm. long by 1.0-1.5 mm. broad, cylindrical, tapering gradually posteriorly; yellowish-brown, glossy; segments distinct; third to eighth abdominal segments with two dorsal transverse rows of brown spines, those of the anterior row the larger; second and ninth abdominal segments with only a single row of smaller spines; spiracles oval, brown, cremaster dark brown, with eight brown hooked hairs.

The pupal period varies from about five days in the Hot Weather to about twentyfour days in the Cold Weather. (Pusa Insectary Cage-Slips Nos. 2114 and 2461).

#### ENARMONIA MALESANA, MEYRICK.

*Laspeyresia malesana*, Meyr., Exot. Micr. II 352 (1920)<sup>1</sup>; Fletcher, Ind. Agric. Ent. Mem. VI 64 (1921)<sup>2</sup>.

This was also reared from pods of *Cassia auriculata* from Bombay (Beeson)<sup>1</sup>.

#### ENARMONIA OCHROPA, MEYRICK (PLATE XXII).

*Lipoptycha ochropa*, Meyr., B. J. XVI 587 (1905)♂<sup>1</sup>.

*Laspeyresia ochropa*, Meyr., B. J. XVIII 144 (1907)<sup>2</sup>.

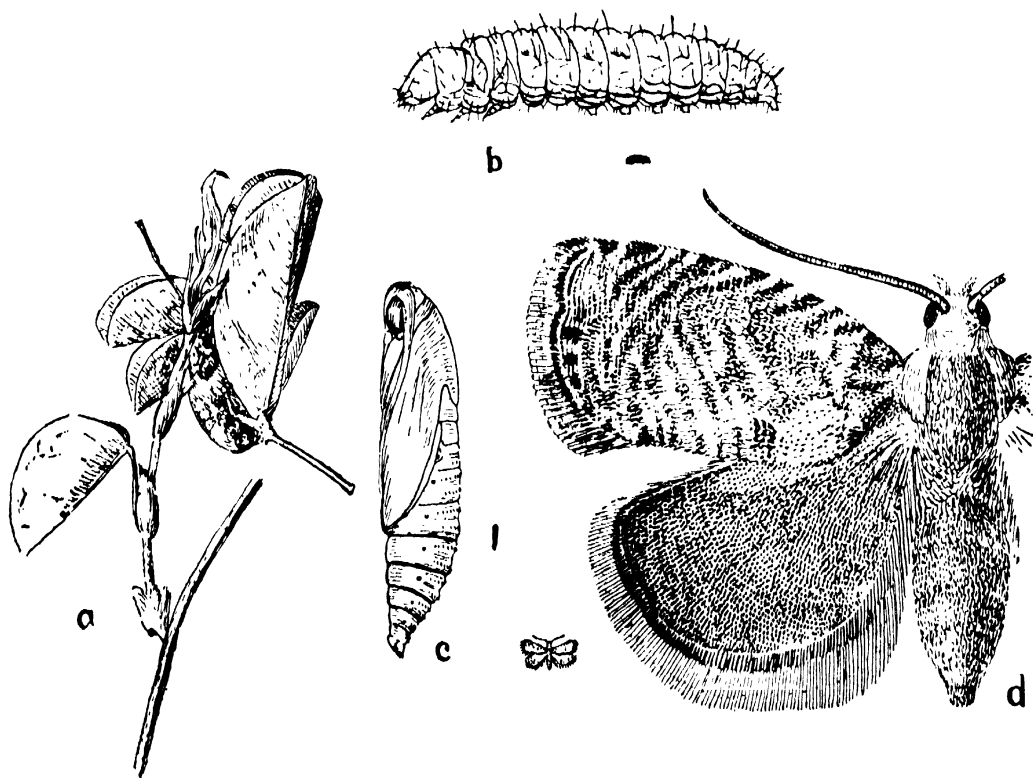
This was originally described from Kandy.

Larvæ were found at Pusa in October 1920 and 1921 and in November and December 1920 rolling and binding together four or five leaves of *Desmodium* sp. by means of fine silken threads on the underside, living inside a felted mass of leaf-hairs on the underside of the leaves and feeding on the green tissue of the leaf and the surface between the veins. Some larvæ also bore in the buds and in the long hairy lanceolate stipules.

When first found the larva was about 2.5 mm. long and 0.5 mm. broad, cylindrical; head prominent, black, bilobed, with a basal depression, partly retracted within prothorax, which was pale yellowish, shiny; legs small, glossy, whitish; general colour pale yellowish; body soft.

The full-grown larva is about 4 mm. long and 0.75 mm. broad, cylindrical; when not active the posterior half of the body is swollen, due to contraction of the

ENARMONIA OCHROPA, MEYRICK.



a. Leaflets bound up  $\times 5$ .

b. Larva  $\times 15$ .

c. Pupa  $\times 15$ .

d. Moth  $\times 15$ .

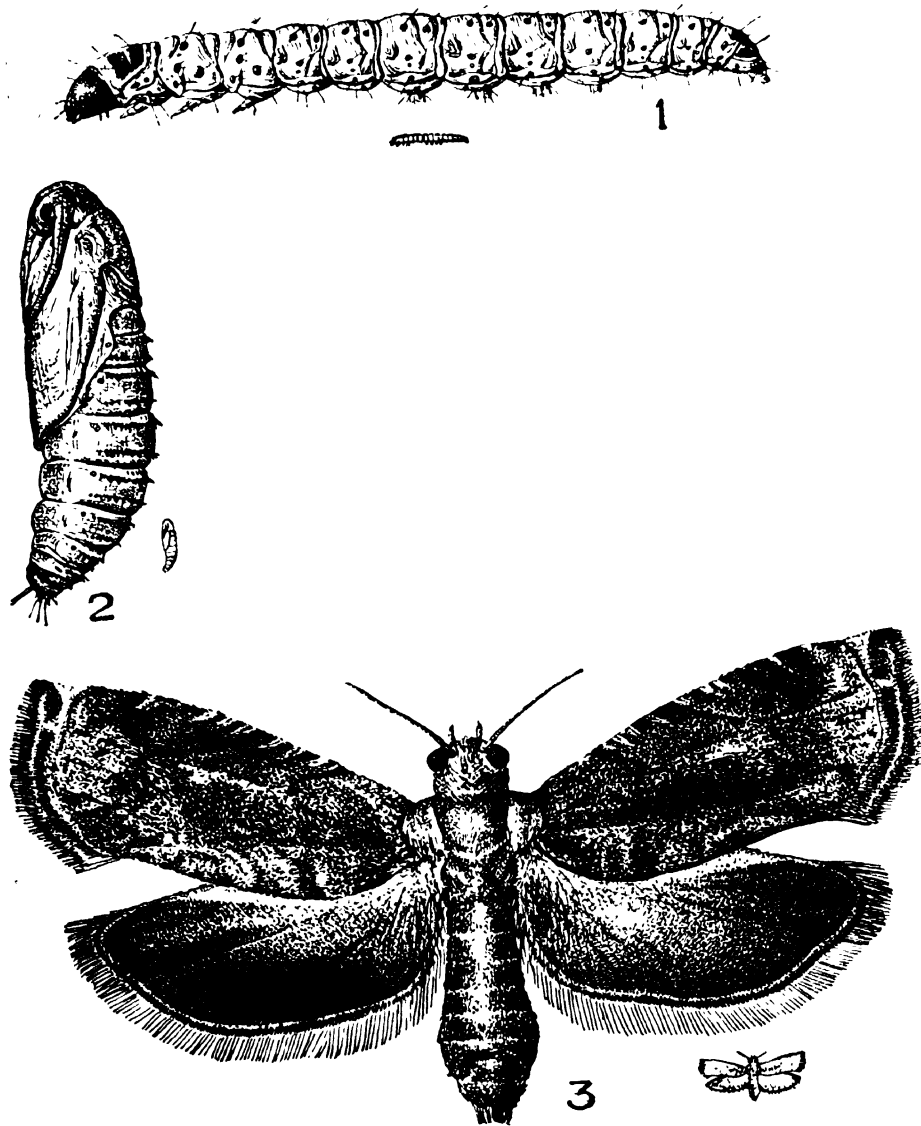
Small figures  $\times 1$ .







ENARMONIA STAPHIDITIS, MEYRICK.



1. Caterpillar  $\times 9$ .
2. Pupa  $\times 9$ .
3. Moth  $\times 9$ .

(Smaller figures show natural sizes.)

segments ; head brown, posterior half retracted within the brown, chitinized prothoracic shield, vertical triangle of head conspicuously bordered with dark brown.

Pupation takes place in a cocoon formed within a few leaves bound together. The pupa is about 3.6 mm. long and 1 mm. broad, light brown ; wing-cases reaching nearly to apex of fourth abdominal segment ; eye-cases rounded, black ; third to seventh abdominal segments with two dorsal transverse rows of small spines, those of the anterior row the larger ; eighth to tenth segments with single rows of brown spines ; spiracles small, light brown, oval. From a larva which pupated on 2nd December 1921 the moth emerged on 27th February 1922 ; the pupal period is doubtless much shorter in warmer weather. (Pusa Insectary Cage-Slip No. 2207).

#### ENARMONIA PALAMEDES, MEYRICK.

*Laspeyresia palamedes*, Meyr., Exot. Micr. I 564 (1916) ♂<sup>1</sup>.

Reared at Coimbatore and Pusa from larvæ on tamarind leaves, also at Nagpur from larva in flower-buds of *Bauhinia purpurea* and at Ramandrug "on *Lantana*" (not apparent whether bred or captured as adult). It is also known from Java.

#### ENARMONIA PERFRICTA, MEYRICK.

(Entl. Mem. VI 201, t. 61, f. 2).

Also reared at Pusa from larva boring in pods of *Pongamia glabra*, feeding on the seeds, and from larva boring shoot of *Cordia myxa*.

#### ENARMONIA PSEUDONECTIS, MEYRICK.

(Entl. Mem. VI 66, t. 15).

Also reared at Pusa from larva boring topshoot of *Tephrosia purpurea*. It has also been received from Indore as attacking *sann*-hemp there.

#### ENARMONIA PYCNOCHRA, MEYRICK.

*Laspeyresia pycnochra*, Meyr., Exot. Micr. II 353 (1920)<sup>1</sup> ; Fletcher, Ind.

Agric. Ent. Mem. VI 64 (1921)<sup>2</sup> ; Meyr., Exot. Micr. III 448 (1928)<sup>3</sup>.

Of four specimens bred by the Forest Entomologist from seeds of *Abrus precatorius* from Saharanpur, the female appears identical with the single female (type) previously bred at Coimbatore from larva in pod of *Sesbania grandiflora*.<sup>3</sup>

#### ENARMONIA STAPHIDITIS, MEYRICK (PLATE XXIII).

*Laspeyresia staphiditis*, Meyr., Exot. Micr. III 604-605 (1930) ♂ ♀<sup>1</sup>.

Larvæ were found at Pusa in November and December 1928 boring flower-bearing twigs of *Bauhinia purpurea* (Leguminosæ). No outward sign of damage was visible

and the larvæ were found in twigs collected at random. In a few cases larval frass may be seen on the twigs and in some cases the narrower twigs had holes, apparently holes of exit of larvæ which had come out to enter into larger twigs. The larvæ also bore in the flower-buds and in the pods.

The full-grown larva is about 9 mm. long and 1 mm. broad ; head small, shiny, brown ; prothoracic shield chitinized, shiny, piceous ; general colour pale greenish, becoming creamy-yellowish when full-fed ; warts chitinized, bearing single hairs, dorsal tubercles arranged trapezoidally, anterior tubercles rounded and larger than the posterior, oval tubercles ; anal plate chitinized, piceous ; prolegs small, with complete circles of hooklets on the rounded soles ; spiracles small, with clear centres and black rims.

Pupation takes place in a small oval cocoon covered with black pellets of frass. On emergence of the moth, the pupacase is extruded for two-thirds of its length from the cocoon, to which it remains attached.

The pupa is about 6 mm. long by 1.75 mm. broad, yellowish-brown ; wing-cases reaching to middle of fourth abdominal segment ; second to seventh abdominal segments with two dorsal transverse rows of spines, those of anterior row the larger ; eighth segment with a single row of spines ; anal segment with six spines and the cremastral hairs ; spiracles rounded, with broad dark-brown rims. The pupal period is about three weeks in December. (Pusa Insectary Cage-Slip No. 2413).

#### ENARMONIA STIRPICOLA, MEYRICK. (PLATE XXIV).

*Laspeyresia stirpicola*, Meyr., Ind. Agric. Ent. Mem. IX 259, t. 24 (1926)<sup>1</sup> ; Meyr., Exot. Micr. III 342 (1927) [redescr.]<sup>2</sup>.

Notes on the life-history have been published by Rai Bahadur C. S. Misra and are repeated for the sake of completeness.

"During a visit to Daltonganj in May 1925, the abnormal presence of these lepidopterous larvæ, boring into the shoots of pollarded *Butea frondosa* (Palas) was first noticed. Practically every Palas tree in the locality was more or less affected and in some branches as many as seven borers were found. The growth is stunted, galls are produced, bark becomes rough and hard and there is considerable outflow of resinous matter and the tree becomes unfit for propagation of lac. This insect may well be regarded as a serious pest of *Butea frondosa*, a tree used extensively for lac cultivation.

"Eggs are laid in the axils of leaf-buds and larvæ tunnel into the stems, reaching the pith, on which they feed. The hole of entry of the larva into the stem is quite conspicuous on account of scarlet coloured granules of resin. The full-fed larva (Plate XXIV, fig. 2) is 11-12 mm. long, 2.3--2.5 mm. broad. It has a shining dark, chocolate-brown, heavily chitinized head, with a triangular excavation in front. The mandibles are very powerful. The prothoracic dorsal plate is well chitinized and has a median longitudinal lighter streak and is armed with a few



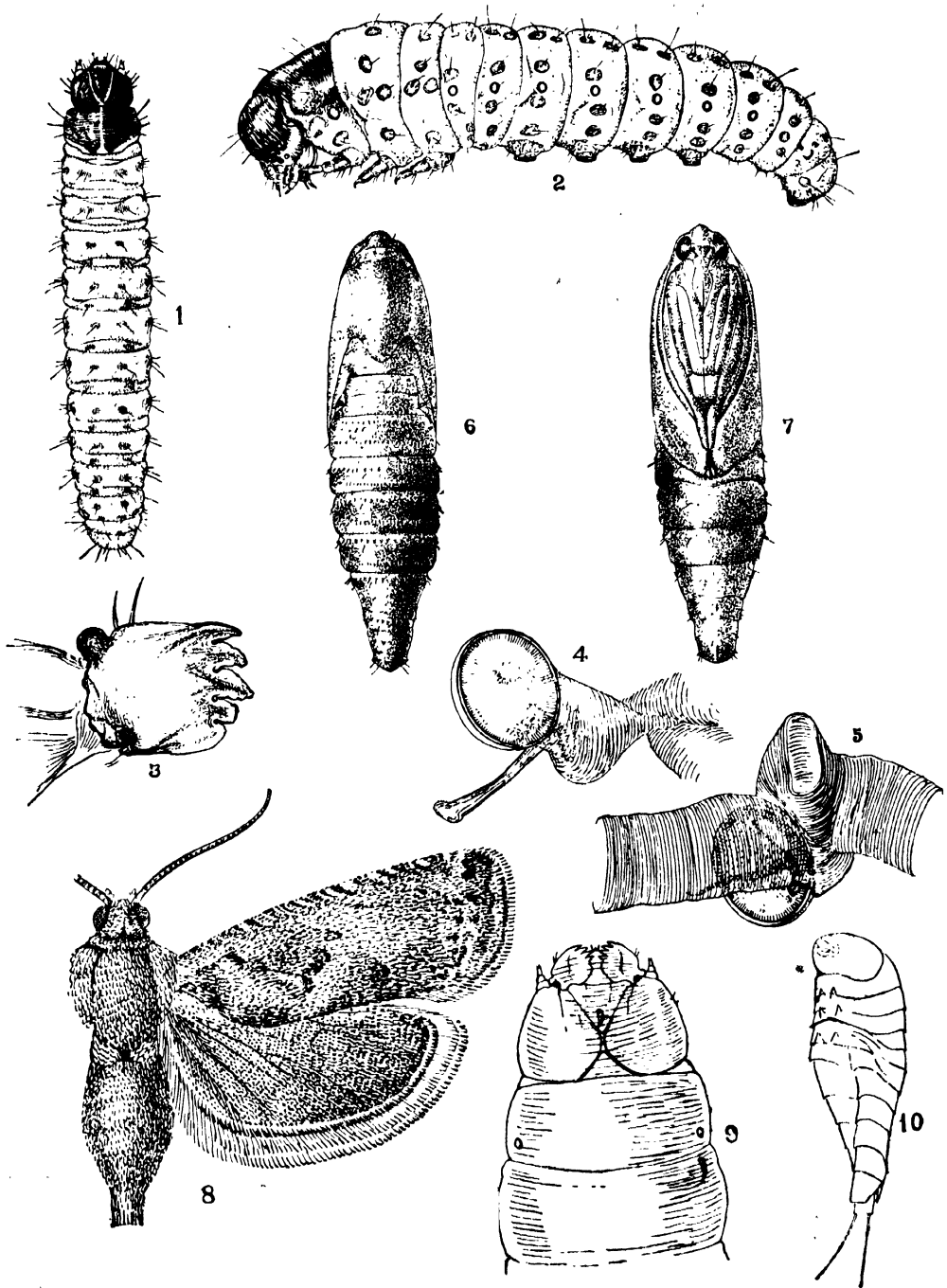
# EXPLANATION OF PLATE XXIV.

## *Laspeyresia stirpicola*, Mey.

1	Borer . . . . .	Dorsal view . . . . .	×·16
2	Borer, immediately before pupation . . . . .	Lateral view . . . . .	×·16
3	Mandible of the borer . . . . .	....	×·120
4-5	Spiracles of the borer . . . . .	....	×·300
6	Pupa . . . . .	Dorsal view . . . . .	×·16
7	Pupa . . . . .	Ventral view . . . . .	×·16
8	Adult moth . . . . .	Dorsal view . . . . .	×·12
9	Triangulinids within the larva of the borer (much enlarged).	....	....
10	Triangulinid . . . . .	Dorsal view . . . . .	×·300

ENARMONIA STIRPICOLA, MEYR.

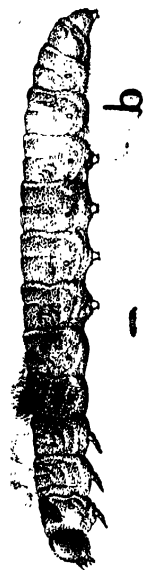
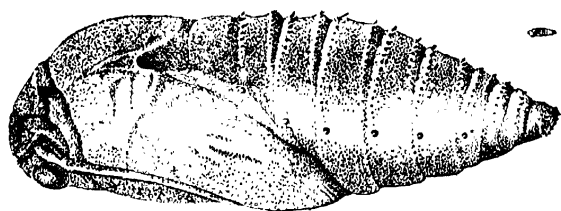
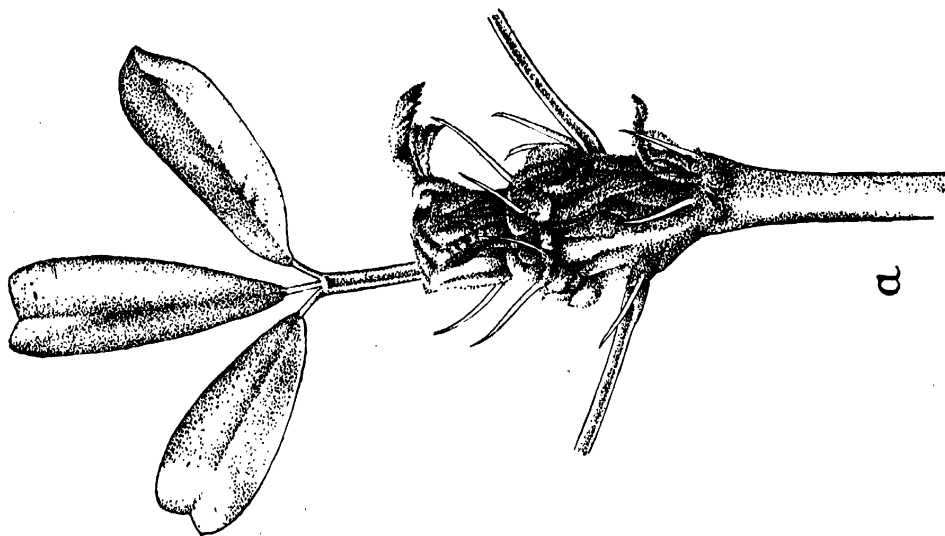
*Laspeyresia stirpicola*, Meyr.











d, The Moth  $\times 15$ .

c, The pupa  $\times 20$ .

b, The larva  $\times 20$ .

a, The sprouted up top shoot indicating the presence of osterpillar inside  $\times 6$ .

(Small figures show natural sizes).

whitish, porrect hairs. The rest of the body is creamy yellow and armed with hairs arising from brownish tubercles. When full fed the larva makes a silken gallery and pupates in it. The pupa (Plate XXIV, figs. 6, 7) is light brown in colour, with black eyes and prominent thoracic segments. The abdominal segments have two rows of short spines near each end, the anal segment has a few short hairs." (C. S. Misra, Ent. Mem. IX 259-260 : 1926).

ENARMONIA TORODELTA, MEYRICK.

(Entl. Mem. VI 67).

Also from Ceylon, where it was reared at Suduganga (near Matalé), by R. Senior-White, from larva boring in seed of *Phaseolus vulgaris*, and it has also been found at Pusa, this being the first record from Northern India.

ENARMONIA TRICENTRA, MEYRICK (PLATE XXV).

(Entl. Mem. VI 65-66.)

Larvæ were found at Pusa in August and September 1920 boring in the tops of stems and branches of *Tephrosia purpurea*. The region of the inflorescence of the plant is usually selected for attack, the topshoot leaves becoming shrivelled and the bored stem swollen into a sort of gall.

The full-grown larva is about 9 mm. long and 1.5 mm. broad, cylindrical, moderately stout, pale yellow ; head and prothoracic plate shiny yellowish-brown ; warts with small, white, single hairs (not shown in the figures) ; prolegs small, glassy white, with the hooklets arranged in a complete circle. When full-fed and about to pupate, the larva becomes bright pink in colour.

Pupation takes place in a white cocoon formed inside a rolled leaf. The pupa is about 4.5 mm. long and 1.5 mm. broad, rather stout, shiny yellow-brown ; second to seventh abdominal segments with two dorsal transverse rows of minute spines, those of anterior row slightly larger than those of posterior ; eighth to tenth segments with a single row of minute spines ; anal segment without any anal process except cremastral hairs ; spiracles oval, slightly raised, brown. The pupal period is about a week in October. (Pusa Insectary Cage-Slip No. 2083).

This species also occurs in Tonkin.

GELECHIADAE.

APATETRIS CAECIVAGA, MEYRICK.

*Apatetris caecivaga*, Meyr., Exot. Micr. III pp. 480 (December 1928) 481, (April 1929).

Described from a single male stated to have been bred in April from *Tamarix articulata* from Gazighat (near Multan, Punjab), together with several examples

of *Trachypepla picromorpha*, but, as the larva was not observed, the single example might have been introduced by chance<sup>1</sup>.

#### PALTODORA CYTISELLA, CURTIS.

*Cleodora cytisella*, Curt., Brit. Entom. XIV, 671 (1837)<sup>1</sup>.

*Paltodora cytisella*, Meyr., Rev. Handb. p. 605 (1928)<sup>2</sup>.

This is an European species whose range extends to Eastern Siberia and Assam. It is known from Upper Shillong and probably occurs throughout the Himalaya. The larva is briefly described<sup>2</sup> as "dark red; plate of 2 black-brown; spiracles white; in slight swellings in stem of bracken (*Pteris aquilina*)".

#### ARISTOTELIA ARTICULATA, MEYRICK (PLATE XXVI).

*Aristotelia articulata*, Meyr., Exot. Micr. II, 119-120 (1918)<sup>1</sup>.

Described from a single female from Coimbatore<sup>1</sup>, this has since been reared at Pusa in June from larvæ on spun leaves of *Ammannia* sp. (Lythraceæ)<sup>2</sup>.

Larvæ were found at Pusa on 20th May 1921 on leaves of *Ammannia* sp., tying together the sessile lanceolate leaves with silken threads and feeding on the mesophyll tissue, leaving only the lower epidermis and, in places, patches of uneaten green tissue. The larvæ are very active.

The larva is about 7 mm. long by 0.75 mm. broad, cylindrical, rather elongate; head and prothoracic shield blackish; thoracic segments enlarging progressively posteriad; mesothorax and metathorax dark pinkish-purple, paler ventrally; mesothorax with an anterior subdorsal white dot; legs rather short, black; general colour of body light green tinged pale yellowish; abdominal segments with a mid-dorsal and subdorsal and spiracular dull-green stripes, the subdorsal one slightly broader than the others and with yellowish interruptions; hairs short, bristly, blackish, arising singly from minute black warts; prolegs small, rod-like, pale yellowish, glossy, with hooklets in complete circles; spiracles minute, with blackish or dark-brown rims. Before pupation the body-colour of the larva becomes pale yellowish and the green stripes become bright purple.

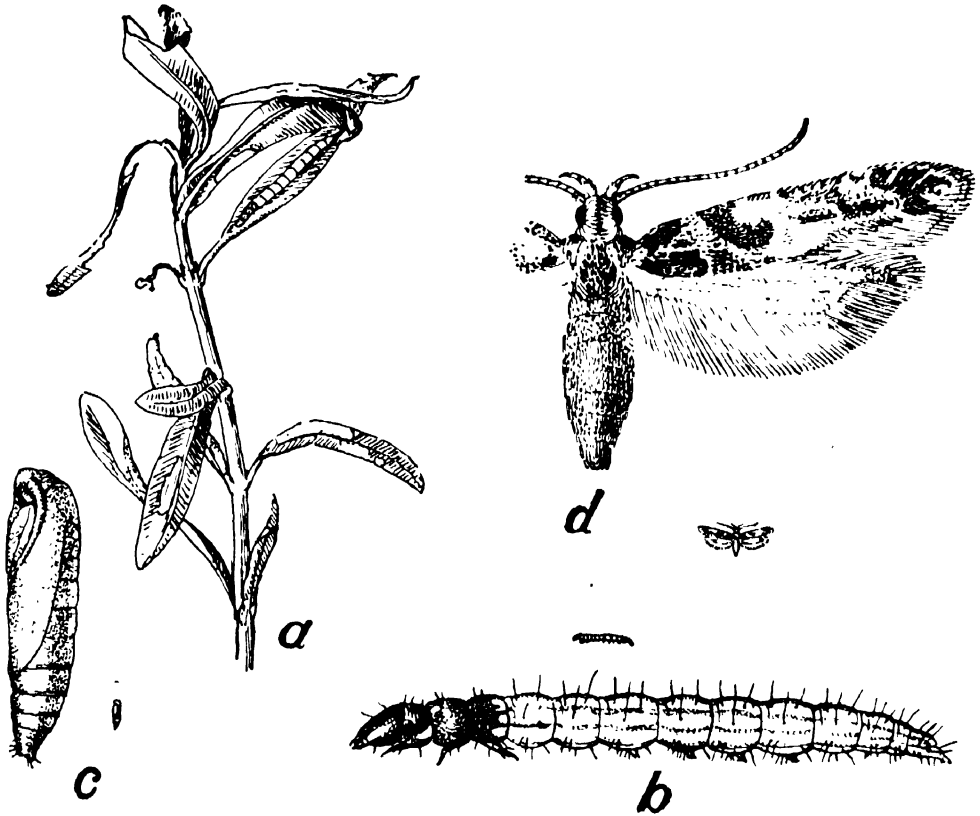
Pupation takes place in an elongate white cocoon spun on the surface of a leaf or under the curled edge of a leaf; a small opening, for the emergence of the moth, is left at the anterior end of the cocoon. The pupa is about 3.25 mm. long and 1 mm. broad, cylindrical, tapering gradually; yellowish-brown; tip of anal segment truncate; spiracles very minute, brown. The pupal period is 5 or 6 days at the end of May. (Pusa Insectary Cage-slip No. 2167.)

#### ARISTOTELIA PALAMOTA, MEYRICK.

*Aristotelia palamota*, Meyr., Exot. Micr. III, 274 (1926).

Bred at Pusa in June from larvæ on spun leaves of *Ammannia* sp. (Lythraceæ)<sup>1</sup>.

ARISTOTELIA ARTICULATA, MEYRICK.



a. The plant showing eaten leaves.

b. The larva  $\times 10$ .

c. The pupa  $\times 10$ .

d. The moth  $\times 10$ .

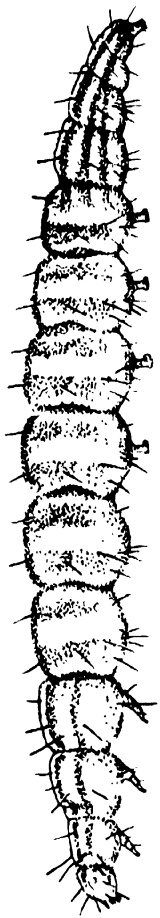
(Small figures show natural sizes.)







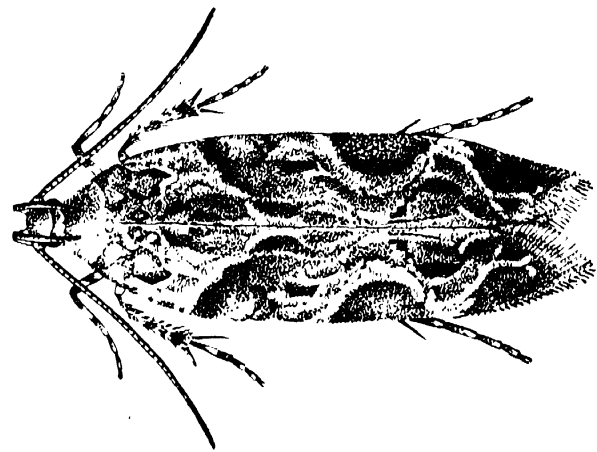
EMPEDAULA INSIPIENS, MEYER.



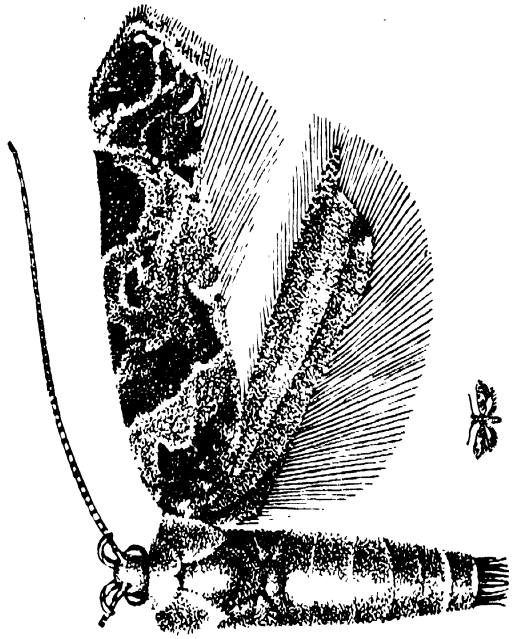
a



b



C



d

a. Larva  $\times 15$ .

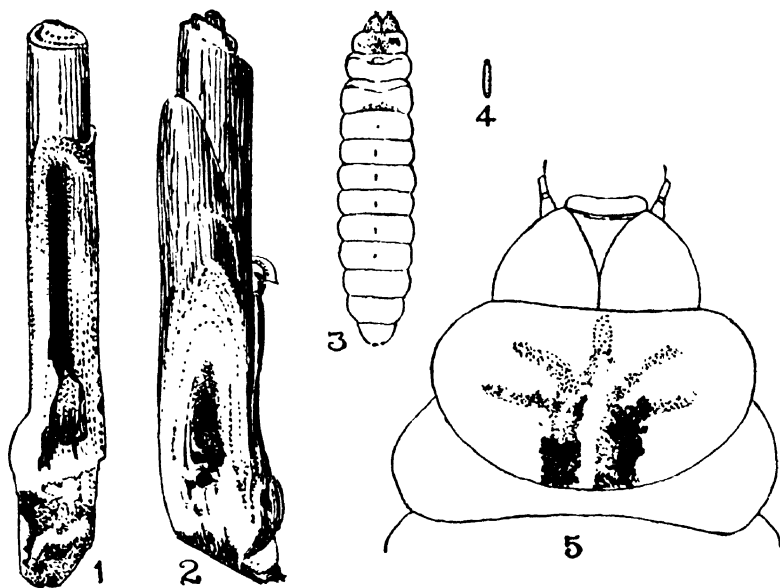
b. Pupa  $\times 15$ .

c. Moth sitting  $\times 15$ .  
(The small figures show the natural sizes.)

d. Moth, wings spread  $\times 15$ .



*EPHYSTERIS CHERSAEA*, MEYRICK.



- 1, 2. Section through basal portion of ratoon shoots of Sugarcane bored by larvæ.  
3, 4. Larva enlarged and natural size.  
5. Diagrammatical dorsal view of larva.

(Figures after Jarvis.)

This was reared at Pusa from larvæ collected on *Ammannia* sp. on 20th May 1921. They were feeding on leaves in the same way as larvæ of *A. articulata*, Meyr., but were not distinguished from those at the time. The pupal period was four days at the end of May. (Pusa Insectary Cage-slip No. 2170.) Larvæ were again found on *Ammannia* leaves at Pusa in October 1924 and October 1928, but were not described.

#### EMPEDAULA INSUPIENS, MEYRICK (PLATE XXVII).

*Empedaula insipiens*, Meyr., Exot. Micr. II, 149 (1918)<sup>1</sup>; Meyr., Exot. Micr. III 11 (1923)<sup>2</sup>.

Originally described from a single female taken at Pusa and afterwards bred at Pusa from larvæ rolling leaves of *Breynia rhamnoides* (Euphorbiaceæ)<sup>2</sup>.

Larvæ were found at Pusa on 18th April 1920 rolling and feeding on topshoots of *Karjani* (*Breynia rhamnoides*) but no description of the larva was made. It was noted that many pupated on 21st April and that moths emerged on 27th April (1), 28th April (9), 4th May (3) and 8th May (1) (Pusa Insectary Cage-slip No. 2001). It was also reared at Pusa on 1st May 1922 from larva rolling *Breynia* leaves.

#### STENOLECHIA TRICHASPIS, MEYRICK.

*Recurvaria trichaspis*, Meyr., Exot. Micr. II, 131 (1918) ♀<sup>1</sup>.

*Stenolechia trichaspis*, Meyr., Exot. Micr. III, 484 (1929)<sup>2</sup>.

Described from Maskeliya<sup>1</sup>, in Ceylon, and subsequently stated to have been bred at Gulmarg in April from *Pinus excelsa*. This latter record requires amendment as Dr. Beeson informs me (*in litt.*) that these examples were bred at Dehra Dun in June 1928 from clusters of needles of *Pinus excelsa* collected at the end of May in Ferozepur Nullah, below Gulmarg; the needles then had larvæ mining in them.

#### EPHYSTERIS CHERSÆA, MEYRICK (PLATE XXVIII).

(Entl. Mem. VI. 72.)

*Ephysteris chersæa* Ghosh, Rept. Fourth Entl. Meeting, p. 127, t. 23, f. 2 (1921); Jarvis, Queensland Bur. Sugar Expt. Stations, Entl. Bull. 3 (2nd edit.) pp. 17-19, t. 1, ff. 6, J. 1 (1927).

The caterpillars occurred at Pusa in small numbers boring *China* stems in June and rice stems in July. The full-grown larva is about 6 mm. long and cylindrical in shape; head reddish brown; prothoracic shield blackish, divided medially; general colour of body pale yellow, with a broad dark grey band on each segment; prolegs equally developed. Pupa about 4 mm. long, cylindrical, tapering posteriorly; anal extremity rounded with a few short thin hooked hairs dorsally; in colour yellow-brown. In one case the larva left the stem and pupated underground. (Ghosh).

Jarvis has described the larva as boring in cane shoots in Queensland. He states that this was bred for the first time in Queensland from young ratoon canes in 1919 and "evidently attacks the crop at a very early stage of growth, nearly all the shoots collected in November . . . having been destroyed before attaining a height of nine inches (stem growth). Outwardly the damage to young ratoons corresponds in general appearance with that caused by [other common borers], the destruction of the central or heart leaves being a conspicuous and certain indication of such internal trouble. Upon removing the few short basal leaves surrounding the bottom of an affected ratoon one or more tiny pinholes in the side, near or under the ground level, are usually discernible, and if the shoot be pared away with a sharp knife at this spot a narrow section of its internal basal portion is seen to have been devoured transversely across the stem at one or two places in such manner as to completely sever the central core. The vascular tissue immediately above the seat of this injury soon reddens and gradually decays upwards throughout the length of the ratoon, while the heart leaves, deprived of their usual supply of moisture, quickly wither and turn light yellowish brown. In some instances sides of stems were found to be spirally ringbarked, as it were, near the ground; no sign of such tunnelling, however, being noticed until the lower leaf sheaths had been removed. After destroying the heart leaves in this manner the larva proceeds to tunnel in a downward direction or travel upwards, in the latter case consuming first the dying tissue, and then often boring erratically around the side of the shoot among the softer portions . . . . . The caterpillars of this tiny borer never feed upon or inhabit the central rotting core, often, indeed, vacating a shoot after having devoured the juicy basal part and entering another."

Mr. Jarvis describes the larva as "pale creamy yellow, broadly banded transversely on dorsal surface of eleven body segments with a greyish-pink suffusion, the bands (when seen magnified) consisting of innumerable minute ring-like dots. Occasional specimens just before pupation are dark-reddish. First thoracic segment with two very irregular somewhat triangular or Y-shaped brown blotches, usually blackish posteriorly but sometimes wholly black, and composed of granular markings. Head light yellowish-brown, partly concealed in first body segment; mandibles and outlining of eyes reddish; ocelli six, four of them more or less obscured by an irregular black suffused blotch. Anal segment with two centro-dorsal, white, slightly tuberculate spots surrounded by a dark-brown ring of granular markings. Body subcylindrical, obtusely pointed at each end. Length about 5 mm."

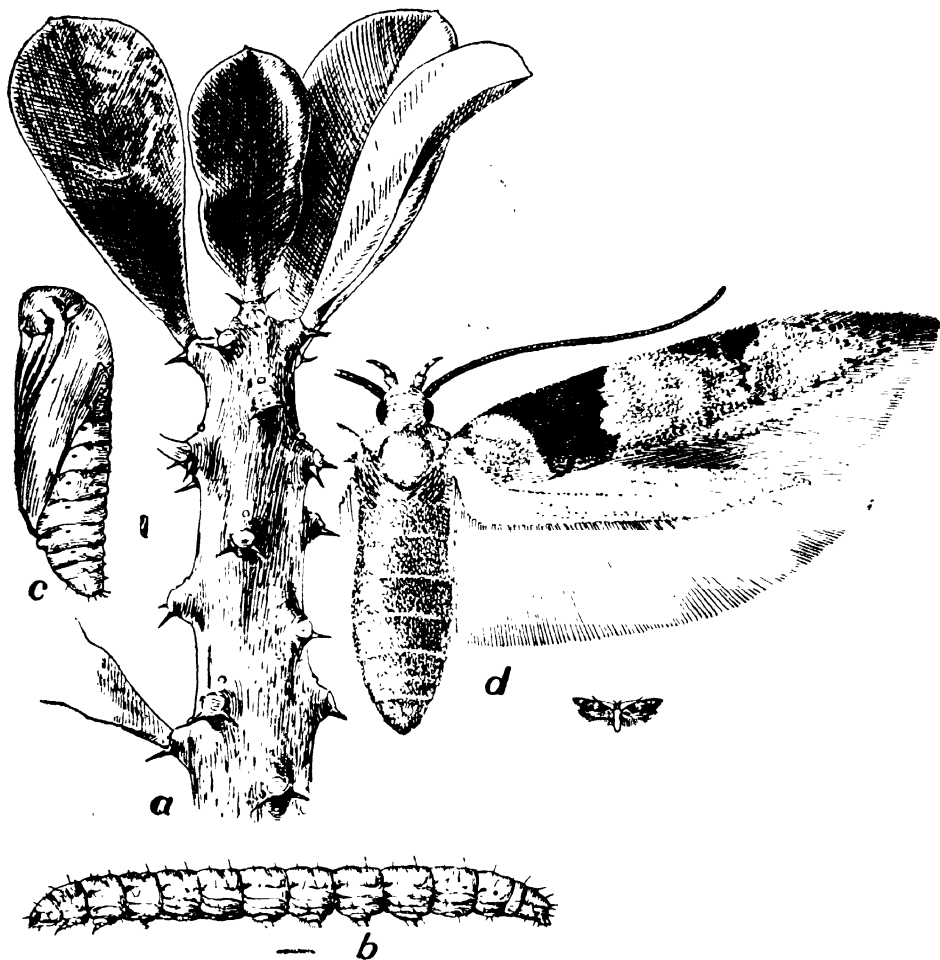
**PEUCOTELES HERPESTICA, MEYRICK.**

*Peucoteles herpestica*, Meyr., Exot. Micr. IV, 57-58 (1931)<sup>1</sup>.

Bred in September from *Pinus khasia* from Shillong (Forest Research Institute)<sup>1</sup>.



TELPHUSA MELANOZONA, MEYRICK.



a. Part of the plant showing a mined leaf.  
b. The larva  $\times 13$ .  
c. The pupa  $\times 13$ .  
d. The moth  $\times 13$ .  
(Smaller figures show natural size).

## APHANOSTOLA ATRIPALPIS, MEYRICK.

*Aphanostola atripalpis*, Meyr., Exot. Micr. IV, 57 (1931)<sup>1</sup>.

Reared at Pusa from pupæ found on leaves of *Acacia catachu*.<sup>1</sup>

## TELPHUSA IMPROVIDA, MEYRICK.

*Telphusa improvida*, Meyr., Exot. Micr. III, 275-276 (1926).

Reared at Karwar in September from a yellowish-green larva with dark green dorsal canal found on *Odina wodier* (Anacardiaceæ) in a cell between overlapping edges of leaves spun flatly together, excrement ejected through a hole in underside of cell; cocoon flat, spun between leaves (Maxwell)<sup>1</sup>.

## TELPHUSA MELANOZONA, MEYRICK (PLATE XXIX).

(Entl. Mem. VI. 71.)

Larvæ were found at Pusa on 13th November 1920, mining the fleshy leaves of *Euphorbia nerifolia*, eating away the succulent fleshy tissues between the surfaces of the leaf. The galleries open into small holes on either surface and through these the frass is extruded.

The larva is about 10 mm. long and rather over 1 mm. broad, elongate, cylindrical, tapering very slightly towards either extremity; head yellowish-brown, broader than long; prothorax yellowish, shining, with slight plate; legs shining pale yellow; general colour dull yellow; hairs short, single; prolegs shining very pale yellow, with complete oval circle of hooklets; spiracles minute.

The larva emerges from the mine when full-fed and spins a white silken cocoon in any convenient corner. The pupa is about 4.5 mm. long and 1.5 mm. broad, subcylindrical, tapering gradually posteriorly; yellow-brown, glossy; spiracles small (Pusa Insectary Cage-slip No. 2163).

Larvæ collected in November (at the beginning of the Cold Weather) formed cocoons then but remained as resting larvæ for some months, in one case until 2nd March and in another until about 18th May, the moth in the latter case emerging on 24th May. This long resting-larva stage forms an interesting parallel to that found in *Platyedra gossypiella*. Other larvæ collected in the Rains, on 20th July 1921, showed no such resting-stage, but pupated on 25th July, the moths emerging after a few days. As more larvæ were found on 23rd August 1921 there would appear to be a constant succession of broods between about April and November and resting-stage larvæ during the remainder of the year.

## GELECHIA TAMARICIELLA, ZELLER.

(Ent. Mem. VI. 82.)

This is a common species throughout the Plains of Northern India in all districts where *Tamarix* occurs.



Larvæ were found at Pusa on 14th March 1931 feeding on leaves of *Tamarix gallica*. The full-grown larva is about 7.5 mm. long and 1.75 mm. broad, reddish-purple, with very short bristly hairs arising singly; thoracic legs colourless; prolegs thin, cylindrical, colourless, with brown hooklets; spiracles minute. Pupation takes place in a thin, flimsy, transparent white cocoon spun between leaves of the foodplant. The pupa is about 6.25 mm. long and 1.5 mm. broad, cylindrical, tapering gradually posteriorly, yellowish brown; segments distinct, except eighth to tenth abdominals; wing-cases reaching to middle of fifth abdominal segment; terminal segment with one prominent brown spine stouter than the fine cremastral hooks; spiracles minute, oval, slightly raised; prothorax and all abdominal segments closely covered with small pits in each of which is situated a very minute single spine. Pupal period about nine days in March. (Pusa Insectary Cage-slip No 2626.)

PLATYEDRA GOSSYPIELLA, SAUNDERS.

(Entl. Mem. VI. 79-82, t. 19.)

Further information on the Pink Bollworm of Cotton will be found in the Report of the Proceedings of the Third Entomological Meeting (Fletcher, I, 153; Fletcher and Misra, II, 445, 453; Gough, II, 80-92; and Willcocks, II, 532-547: 1920). It has been found in the Malay Peninsula on cotton (Corbett and Gates, Dept. Agric. F. M. S. Bull. 38, p. 8; 1926) and has invaded the Southern United States, Southern Europe, and Northern Australia. Good figures will be found in a paper by Heinrich in the *Journal of Agricultural Research*, XX, 808-809, t. 101 ff. A,B, t. 103 f. A, t. 105 ff. C, E, t. 106 f. A, t. 107 ff. A-D (Mch. 1921). It is, of course, very easily carried to new localities by larvæ in cotton seeds, especially in uncleaned or badly cleaned cotton, but its normal ability for dispersal by natural means is much greater than is generally realized. Experiments and observations in America have shown that it may be carried in the adult state by Upper Air Currents for as much as two hundred miles from its place of origin. The connection of such wide dispersal with any merely local methods of control is obvious.

In the Sudan the Braconid, *Microbracon kirkpatricki*, Wilkinson, is an important parasite and attempts to distribute this have been made by the Imperial Institute of Entomology (Thompson, *The Biological Control of Insect and Plant Pests*, pp. 104-105: 1930).

STEGASTA VARIANA, MEYRICK.

(Entl. Mem. VI. pp. 83, 202, t. 62 f. 1.)

This has been reared in the Malay Peninsula from larvæ on groundnut, *Cassia fistula* (tying the leaves), and *C. mimosoides* (Corbett and Gates, Dept. Agric. F. M. S., Bull. 38, p. 8; 1926).

This has been reared from larvæ on leaves of *Cassia tora* at Pusa and at Tinsukia (Assam).

## PHTHORIMÆA ATOMATINA, MEYRICK.

Dr. C. Beeson informs me (*in litt.*, 8 May 1931) that this has been bred "from galls in *Tamarix dioica* stems collected near Ghazighat, Multan District; caged in September 1928, emerged April-June 1929; the galls are elongate fusiform, up to an inch or so long, with a large chamber; emergence hole circular, at one end. The larval remains are not good enough to describe." This species is not known to me and its description is still unpublished.

## PHTHORIMÆA BLAPSIGONA, MEYRICK.

(*Entl. Mem.* VI. 75, t. 17 f. 1.)

The larvæ are parasitized by a *Microbracon* sp., as recorded by Ramakrishna Ayyar (*Rept. Third Entl. Meeting* III 933: 1920).

## PHTHORIMÆA ERGASIMA, MEYRICK.

(*Entl. Mem.* VI. 76-77, t. 17 f. 2.)

This has also been found mining brinjal leaves in Iraq, and it has been reared in the Malay Peninsula from *Solanum melongena* and *S. verbascifolium* (Corbett and Gates, Dept. Agric. F. M. S., Bull. 38, p. 8: 1926).

## PHTHORIMÆA HELIOPA, LOWER.

(*Entl. Mem.* VI. 73-74.)

Reared at Pusa in February 1928 from larvæ boring in topshoots of *Solanum melongena*, a hitherto unrecorded foodplant.

This species has also been reared in the Malay Peninsula from tobacco (Corbett and Gates, Dept. Agric. F. M. S., Bull. 38, p. 8: 1926) and in Palestine from larvæ making galls in tobacco stems (Bodenheimer, *Bull. Soc. Ent. Egypte* 1926, pp. 66-67, f. 1: 1927). In the latter reference figures of the gall and moth are given.

In India it has been noted to be parasitized by a Braconid of the genus *Chelonella* (Ramakrishna Ayyar, *Rept. Third Entl. Meeting* III 934: 1920).

## PHTHORIMÆA OPERCULELLA, ZELLER.

(*Entl. Mem.* VI. 75-76, t. 18.)

No parasites of this destructive pest, which is of comparatively recent introduction, have been noted in India. In California an important enemy is *Microbracon johanseni*, Viereck, and attempts are being made to cultivate this by the Imperial Institute of Entomology. (Thompson, *The Biological Control of Insect and Plant Pests*, p. 104: 1930.)

Its distribution within our limits has been extended to Shillong (August-October 1919), Suduganga (Matalé district, Ceylon; August 1918), Ramgarh (Kumaon: August 1918). It has been reared at Pusa on more than one occasion from larvæ mining potato leaves.

**NOTHRIS HASTATA, MEYRICK (PLATE XXX).**

*Nothris hastata*, Meyr., Exot. Micr. II, 152 (1918).

Reared at Pusa 24th April—9th May 1928 from larvæ found forming cocoons inside bamboo sheaths on 27th March and 5th April. The larvæ do not seem to feed on the bamboo sheaths but merely go inside the fibrous tissue to form a cocoon under shelter. The real foodplant is not known.

The full-grown larva is about 10 mm. long and 1.75 mm. broad, cylindrical, tapering slightly posteriorly; head glossy, reddish-brown, ocellar region blackish; thoracic shield black, chitinized, with a median dividing line, anterior edge colourless; thoracic legs blackish except for brownish terminal segment; general colour of thorax and abdomen salmon-pink (this colour being perhaps only acquired prior to pupation); segments distinct, with transverse dorsal creases and folds; hairs fine, minute, arising singly from minute, dark brown, chitinized tubercles, of which the anterior trapezoidals are the smallest whilst the lateral tubercles are larger and more prominent; spiracles minute, rounded, with narrow blackish rims enclosing clear centres; prolegs five, short, cylindrical, glossy, creamy yellowish, with hooklets on incomplete circles, a small outer portion being free of hooklets; anal plate chitinized, blackish brown. Pupa not described. Pupal period five to eleven days in April. (Pusa Insectary Cage-slip 2394.) This species was also bred at Pusa on 25th February 1930 from a pupa found inside a bamboo sheath on 7th February.

**POLYHYMNO ALCIMACHA, MEYRICK.**

*Polyhymno alcimacha*, Meyr., Exot. Micr. II, 129 (1918).

Described from South India and Assam.

This species was reared at Pusa on 3rd July 1930 from a pupa found on a leaf of *Acacia catechu*.

**COLOBODES ACANTHOPA, MEYRICK.**

*Idiophantis acanthopa*, Meyr., Exot. Micr. IV, 64 (1931)<sup>1</sup>.

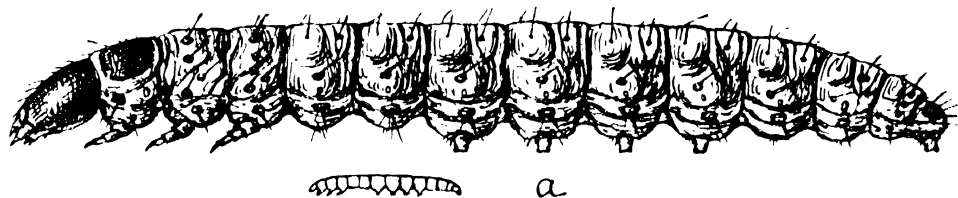
Bred at Dehra Dun in September from *Eugenia jambolana* (Myrtaceæ)<sup>1</sup>.

**COLOBODES CHIRIDOTA, MEYRICK.**

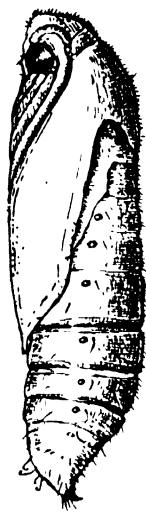
(*Entl. Mem.* VI. 72.)

This has been reared in the Malay Peninsula from *Eugenia malaccensis*, *E. jambos*, and *Durio zibethinus* (galls) (Corbett and Gates, *Dept. Agric. F.M.S., Bull.* 38, p. 8: 1926).

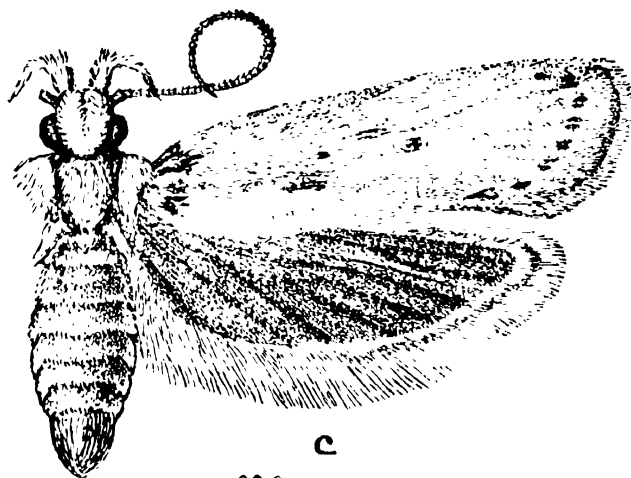
NOTHRIS HASTATA, MEYRICK.



a



b



c

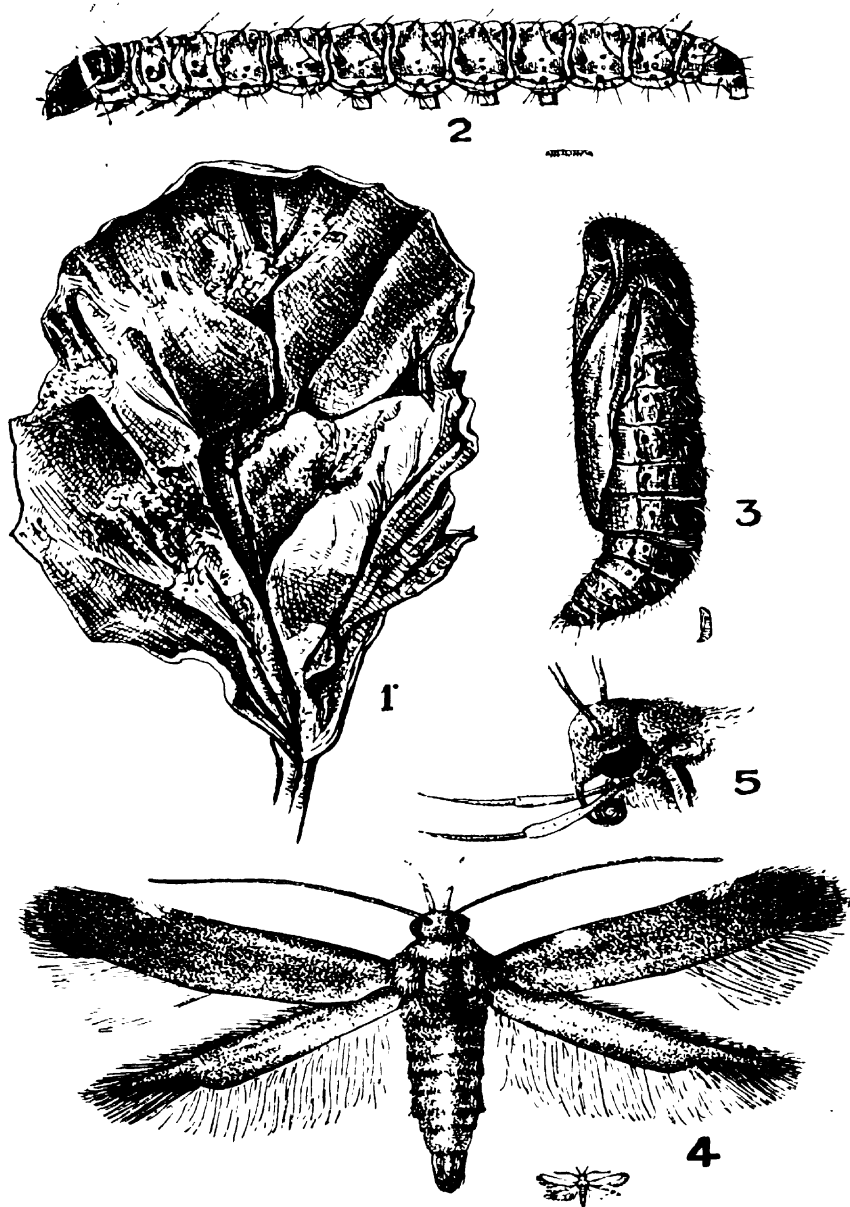


- a. Larva  $\times 9$ .  
b. Pupa  $\times 9$ .  
c. Moth  $\times 9$ .

(The small figures are  $1\frac{1}{2}$  times the natural sizes.)







1. Mined leaf upper surface, natural size.
  2. Larva  $\times 15$ .
  3. Pupa  $\times 12$ .
  4. Moth  $\times 18$ .
  5. Head of moth  $\times 18$ .
- (The small figures show the natural sizes).

## STOMOPTERYX SPHENODOXA, MEYRICK.

*Stomopteryx sphenodoxa*, Meyr., Exot. Micr. IV, 63 (1931)<sup>1</sup>.

Bred at Mahabaleshwar in May from pupæ in folded edge of leaves of *Crotalaria* (Leguminosæ) ; empty mines of larvæ observed in the leaves (*R. M. Maxwell*)<sup>1</sup>.

## STOMOPTERYX SUBSECIVELLA, ZELLER (PLATE XXXI).

*Gelechia* (*Brachmia*) *subsecivella*, Zell., Micr. Caffr. pp. 113-114 (1852)<sup>1</sup>.

*Xystophora modicella*, van Deventer, Tijds. Ent. XLVII 4-7, t. 1 ff. 2, 2<sup>a</sup> (1901)<sup>2</sup>.

*Stomopteryx nerteria*, Meyr. ; Fletcher, Ind. Agric. Ent. Mem. VI, 77-79 (1921)<sup>3</sup>.

This little moth is one of those unfortunate insects which have suffered from an excess of nomenclature. Originally described by Zeller from a female from Rondebosch in South Africa, it was again described by van Deventer from Java, where the larva was found on *Soya hispida*, and redescribed by Meyrick in 1906 from Ceylon. It is, perhaps, as well that an earlier generic name, *Harpagus*, Stephens 1834, is invalid, being preoccupied by Vigors in Aves ; Spuler has, however, added the unnecessary generic synonym *Schützeia*, Spuler 1910.

*S. subsecivella* has been reared in the Malay Peninsula from larvæ on groundnut, soybean and gingelly (Corbett and Gates, *Dept. Agric. F.M.S., Bull.* 38, p. 8 : 1926) ; it does not seem to have been noticed on gingelly (*Sesamum indicum*) in India. Ramakrishna Ayyar has recorded that the larva is parasitized by a species of *Chelonnella* (*Rept. Fourth Entl. Meeting*, p. 365 : 1921).

Larvæ were found at Pusa on 9th January 1924 and on 24th November 1928, mining leaves of *Psoralea corylifolia*. The larva mines under the upper epidermis, anywhere on the upper surface of the leaf. Generally a single larva mines in one leaf, feeding on the entire green tissue between the leaf-surfaces, but any number, up to about a dozen, of larvæ may be found in one leaf and, when this is badly mined, it crumples up and becomes brown and dry. After mining a small portion the larva prepares a silken gallery or pocket inside the mine, above which the upper surface of the leaf turns brownish ; this gallery serves as a recess for the deposition of frass, which collects in it, and also as a retreat for the larva which withdraws itself inside the gallery on disturbance. Having prepared this gallery, the larva extends its mine in front of it and feeds on the green tissue of the leaf. If this gallery is cut open, the larva is able to repair it. If removed from its mine and placed on another leaf, the larva is capable of forming a fresh mine or it may bind two superposed leaves together and live in the shelter so formed.

The full-grown larva is 5-6 mm. long and 1 mm. broad, moderately stout, cylindrical, tapering gradually posteriorly from about the seventh abdominal segment ; head shiny, blackish, broader than long, nearly as broad as prothorax under which it is partially retracted ; prothoracic shield chitinated, shiny, black, not reaching



anterior margin of segment, with a fine yellowish median line which does not completely divide it; mesothorax and metathorax with fleshy folds anteriorly; legs black, glossy, basal segment with an incomplete chitinized black ring; general colour of body brown, mid-dorsally dull bluish edged with pinkish, or general colour light green with pale pinkish-purple sub-dorsal and spiracular stripes; fine short brownish hairs arising singly from minute black tubercles which are arranged trapezoidally on dorsum; prolegs short, cylindrical, greyish or glassy whitish with a faint circular sooty basal band, with black hooklets on upper and lower parts of sole, leaving the sides open; anal plate slightly chitinized, shiny, blackish; spiracles minute, circular, with clear centres and black rims.

Pupation takes place inside the larval mine or between folds of leaves, in a thin white oval cocoon. The pupa is about 4.4-5 mm. long and 1.1-1.5 mm. broad, sepia-brown or blackish, shining; wing-cases reaching nearly to apex of fifth abdominal segment; all segments covered with numerous short fine light-brown or yellowish hairs, more prominent on dorsal surface of abdominal segments and on ventral surface not covered by wing-cases. The pupal period is about 6-15 days in the Cold Weather at Pusa. (Pusa Insectary Cage-slips Nos. 2280 and 2411.)

#### ANACAMPSIS RIVALIS, MEYRICK.

*Anacamptis rivalis*, Meyr., Exot. Micr. II 141-142 (1918)<sup>1</sup>; Meyr., Exot. Micr. III, 281 (1926)<sup>2</sup>.

Described from the Shevaroy Hills,<sup>1</sup> in South India, and from Kandy,<sup>1</sup> and bred at Karwar in July by Mr. Maxwell. Larva elongate, strongly incised, dull green, centre of each segment tinged reddish, a subdorsal series of undefined darker reddish spots; spots black, with long single bristles; head orange; plate of 2 orange, posterior edge black; between spun leaves of *Terminalia belerica* (Combretaceæ) (Maxwell)<sup>2</sup>.

#### COCONYMPHA IRIARCHA, MEYRICK.

*Coconympha iriarcha*, Meyr., Exot. Micr. IV, 66 (1931)<sup>1</sup>.

Bred in December at Kakalundi, Malabar, from larvæ feeding on leaves of *Cocos nucifera* (Y. Ramachandra Rao)<sup>1</sup>.

#### TRICYANAULA AMETHYSTIAS, MEYRICK.

*Strobisia amethystias*, Fletcher, Ind. Agric. Ent. Mem. VI, 89 (1920)<sup>1</sup>.

*Tricyanaula amethystias*, Meyr., Wyt. Gen. Ins. fasc. 184, p. 131 (1926)<sup>2</sup>.

Also found in South India<sup>2</sup>. Mr. Meyrick's collection contains a specimen from Dibidi, in Coorg.

## ONEBALA BLANDIELLA, WALKER.

(Entl. Mem. VI, 83.)

The third reference, with occurrence in Burma, refers to *Onebala lamprostoma*, Zeller, and should be deleted.

## ONEBALA HIBISCI, STANTON.

*Crætopola eudela*, Turner, Proc. R. Soc. Queensl. XXXI, 160 (1919).

*Helcystogramma hibisci*, Fletcher, Ind. Agric. Ent. Mem. VI, 87 (1920).

This species is also found in Tonkin and N. Queensland. It is now placed in the genus *Onebala*, Walker 1864, of which *Helcystogramma*, Zeller 1877, is a synonym.

## ONEBALA LAMPROSTOMA, ZELLER.

*Helcystogramma lamprostoma*, Fletcher, Ind. Agric. Ent. Mem. VI, 203 (1920)<sup>1</sup>.

*Anacamptis scutata*, Mey., T. E. S. 1894, 14 (1894)<sup>2</sup>.

*Onebala blandiella* [nec. Wlk.], Meyr., T. E. S. 1894, 16 (1894)<sup>3</sup>.

*Aproctrema lamprostoma*, Wlsm., E. M. M. XXXVII, 236 (1901)<sup>4</sup>.

*Onebala lamprostoma*, Wlsm., E. M. M. XL, 267-268 (1904)<sup>5</sup>.

*Trichotaphe lamprostoma*, Wlsm., P. Z. S. 1907, 943-944 (1908)<sup>6</sup>.

This was reared by Lord Walsingham in Tenerife from a larva on *Convolvulus althæoides*,<sup>6</sup> but the larva was not described. This species also occurs in Burma, where it has been found at Fort Stedman<sup>2</sup> and Mone<sup>3</sup>.

## MYCONITA PLUTELLIFORMIS, SNELLEN.

*Trichotaphe plutelliformis*, Fletcher, Ind. Agric. Ent. Mem. VI, 203 (1920).

This species is now placed in the genus *Myconita*, Meyr. 1923 (Exot. Micr. III, 27).

Also reared at Pusa from larvæ rolling sweet-potato leaf on 21st November 1919. The larva was described as about 12 mm. long and about 2 mm. broad, subcylindrical, slightly tapering towards either extremity; head shiny brown; prothoracic shield large, brown; body uniformly pale yellow, acquiring a greenish tinge from ingested food; hairs black, on minute black warts; spiracles rounded, with clear centres and narrow dark-brown rims. Pupa 7-8 mm. long, tapering posteriorly to a point; on each side of dorsal region a series of small black pits arranged longitudinally; along mid-dorsal line the intersegmental areas between first four abdominal segments each with a black pit; cremastral hairs entangled in silken fibres of cocoon formed in a rolled leaf. Pupal period about three weeks in December. (Pusa Insectary Cage-slip No. 1971.)

NOTE.—Of six larvæ, one proved to be *Onebala lamprostoma*, Zeller, on emergence of moth. It is possible, therefore, that the above description applies to *O. lamprostoma* and not to *M. plutelliformis*. The description, however, agrees with that previously given of the larva of *M. plutelliformis*.

## METEORISTIS RELIGIOSA, MEYRICK.

*Meteoristis religiosa*, Meyr., Exot. Micr. III, 28 (1923).

Bred at Pusa in May from larva boring aerial roots of *Ficus religiosa*. It was also reared at Pusa on 10th June 1927 from larva in aerial roots of *Ficus bengalensis*.

## EPIMIMASTIS GLAUCODES, MEYRICK.

*Epimimastis glaucodes*, Meyr., B. J. XX, 461 (1910).

Described from Maskeliya, in Ceylon.

Has been reared in Travancore from larva on *Calophyllum inophyllum* (R. M. Pillai's Cage-slip No. 525 [? S. 25]), but we have no details beyond the fact that the moth emerged on 18th February 1922.

## ANARSIA ACERATA, MEYRICK.

(Entl. Mem. VI, 91.)

I think that the record of this from Saidapet (reared from larva on *Cajanus indicus*) may refer to *Anarsia omoptila*, Meyrick. The single female to which the record refers was named as *A. acerata* (?) by Mr. Meyrick; it is not in good condition but is perhaps really *A. omoptila*.

*A. acerata* has also been recorded from Tonkin.

## ANARSIA EXALLACTA, MEYRICK MS.

(Entl. Mem. VI, 93.)

The name *exallacta* is a *nomen nudum* and the information previously given should be referred to *A. omoptila*, Meyr.

## ANARSIA LINEATELLA, ZELLER (PLATE XXXII).

*Anarsia lineatella*, Zell., Isis XXXII 190 (1839)<sup>1</sup>.

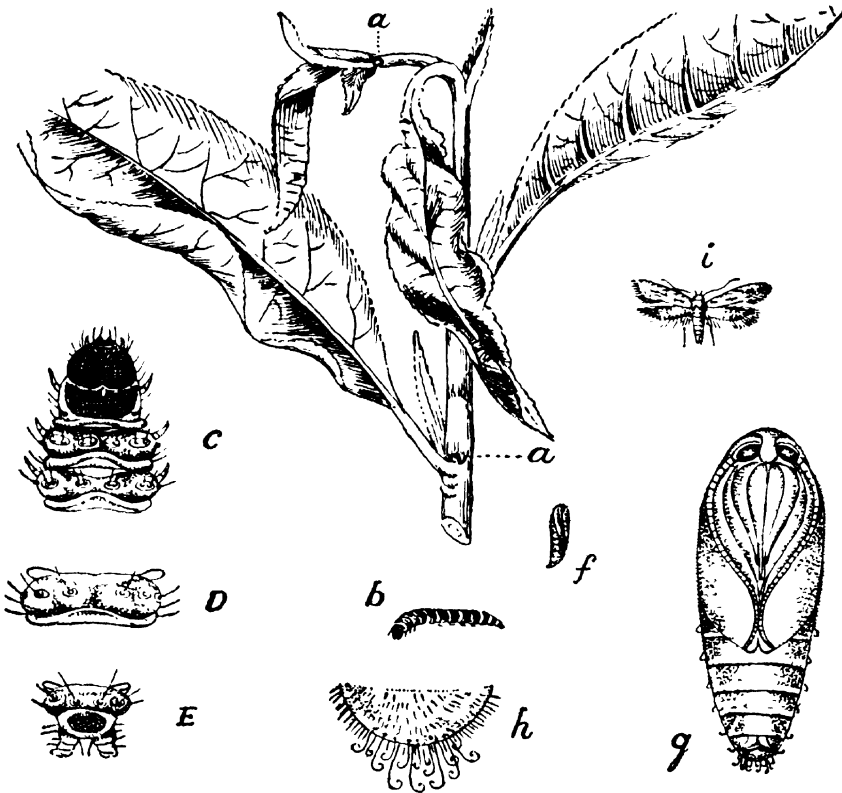
? *Tinea pullatella*, Hb., Samml., Tin. t. 17 f. 118 (1796)<sup>2</sup>.

*Anarsia lineatella*, F. R., Microlep. pp. 282-284, t. 94 ff. a-i, t. 95 ff. 1 a-g (1841)<sup>3</sup>; Herr.-Schäff., Schmett. Eur. V, 153 (1854)<sup>4</sup>; Hein., Kleinschm. Deutschl. II, i., 348 (1870)<sup>5</sup>; Spuler, Schmett. Eur. II, 353, t. 88 f. 58. (1910)<sup>6</sup>; Marlatt, U. S. Dept. Agric. Ent. Bull. (n. s.) No. 10, p. 7 (1898) (econ. refs.)<sup>7</sup>; Busck., Proc. U. S. Nat. Mus. XXV, 928-929 (1903)<sup>8</sup>.

*Anarsia* ? *prunicilla*, Clem., Proc. Acad. Nat. Sci. Philad., p. 169 (1860)<sup>9</sup>.

*Anarsia lineatella* occurs within our limits in Kashmir. It is a widely distributed species, known from Central and South Europe, Asia Minor, Iraq, N. Africa, and N. America. It is a well-known pest of peach and of various species of *Prunus*, the larva boring in the shoots and fruits. In Iraq it is known to attack nectarine.

ANARSIA LINEATELLA, ZELLER.



- a, a.* Peach shoot showing boreholes of larvæ.  
*b.* Larva, natural size.  
*c, d, e.* Larva ; details ; magnified.  
*f.* Pupa, natural size.  
*g.* Pupa, enlarged.  
*h.* Pupa, anal segment, more highly magnified.  
*i.* Moth, female.

(Figures after Fischer von Roslerstamm).



## ANARSIA MELANCHROPA, MEYRICK.

*Anarsia melanchropa*, Meyr., Exot. Micr. III, 281-282 (1926)<sup>1</sup>.

Bred at Dehra Dun in October from a larva feeding on flowers of *Acacia gageana* (Forest Entomologist).

## ANARSIA OMOPTILA, MEYRICK.

*Anarsia omoptila*, Fletcher, Ind. Agric. Ent. Mem. VI, 94 (1921)<sup>1</sup>.

*Anarsia exallacta* Fletcher, Rept. Third Entl. Meeting I, 155 (1920)<sup>2</sup>, Ind. Agric. Ent. Mem. VI, 93 (1921)<sup>3</sup>.

? *Anarsia acerata* [nec Meyr.], Fletcher, Rept. Third. Entl. Meeting I, 155 (1920)<sup>4</sup>, Ind. Agric. Ent. Mem. VI, 91 (1921)<sup>5</sup>.

This species is found on *Cajanus indicus*. Mr. Meyrick's collection contains a specimen from Saidapet, and we have one from Saidapet (larva on red gram) which was determined as *acerata* ? by Mr. Meyrick but which is probably *omoptila*.

## ANARSIA PATULELLA, WALKER.

*Gelechia patulella*, Wlk., Cat. XXIX, 635 (1864)<sup>1</sup>.

*Anarsia patulella*, Meyr., B. J. XXII 168, (1913)<sup>2</sup>; Meyr., Wyts. Gen. Ins., fasc. 184, p. 153 (1926)<sup>3</sup>.

Described from Ceylon<sup>1</sup>, where it is known from Peradeniya<sup>2</sup>, Maskeliya<sup>2</sup>, Colombo and Trincomali. It also occurs in South India<sup>3</sup>, where it has been taken in the Nilgiris (3,500 ft.)<sup>2</sup>, and in Queensland<sup>3</sup>.

It has been bred at Pusa on 14th August 1927, from a larva feeding on Tamarind leaflets, and I have taken it at Muktesar (Kumaon; 7,000 ft.).

## ANARSIA SAGMATICA, MEYRICK.

(Entl. Mem. VI. 94.)

This species seems to be attached solely to *Loranthus*, on which it has been reared at Pusa on several occasions, the larva boring in the flower-buds, whose contents are eaten out, and also feeding on the flowers and young leaves. When attacking the leaves, the larva usually binds together two opposite leaves with silken threads and lives within this shelter, eating holes in the leaves or nibbling the upper green tissue only. Sometimes also the larva feeds on tender twigs, eating them downwards from the apex. The larvæ are found at Pusa mostly during the Cold Weather, from December to March, but also in May.

The larva is about 11 mm. long and 2 mm. broad, cylindrical, tapering slightly towards either extremity; head brown with a lateral black marking running up to the ocelli; prothoracic shield yellowish-brown, margined black laterally and posteriorly, and with a blackish spot before the spiracle; mesothorax and metathorax

crimson-purplish ; legs small, with black joints ; general colour of abdomen purplish-brown, the mid-dorsal area creamy-whitish ; segments distinct, bearing fine minute hairs arising singly from slightly chitinated tubercles ; anal plate light brown, edged black, with 4 or 5 small black spiny hairs on hind margin ; prolegs 1-4 very small, with hooklets in incomplete circles, a minute inner portion of sole being free of hooklets ; anal claspers basally blackish-brown with an area of small spiny hairs. Many larvæ fall victims to Hymenopterous parasites.

The pupa is about 6 mm. long and 2 mm. broad, reddish-brown, light ventrally on wing-cases which reach the fifth abdominal segment ; spiracles small, oval, brown. The pupal period varies from about eleven to six days, according to temperature. (Pusa Insectary Cage-slips Nos. 2251, 2360.)

This species is also known from Poona and is doubtless widely distributed in the Plains of India.

#### HYPATIMA HALIGRAMMA, MEYRICK.

*Chelaria haligramma*, Meyr., Exot. Micr. III, 282-283 (1926)<sup>1</sup>.

Described from Anakapalli, in South India, where it was bred from larvæ feeding on flowers of mango (*Mangifera indica*) (Ramachandra Rao)<sup>1</sup>.

#### HYPATIMA SPATHOTA, MEYRICK (PLATE XXXIII).

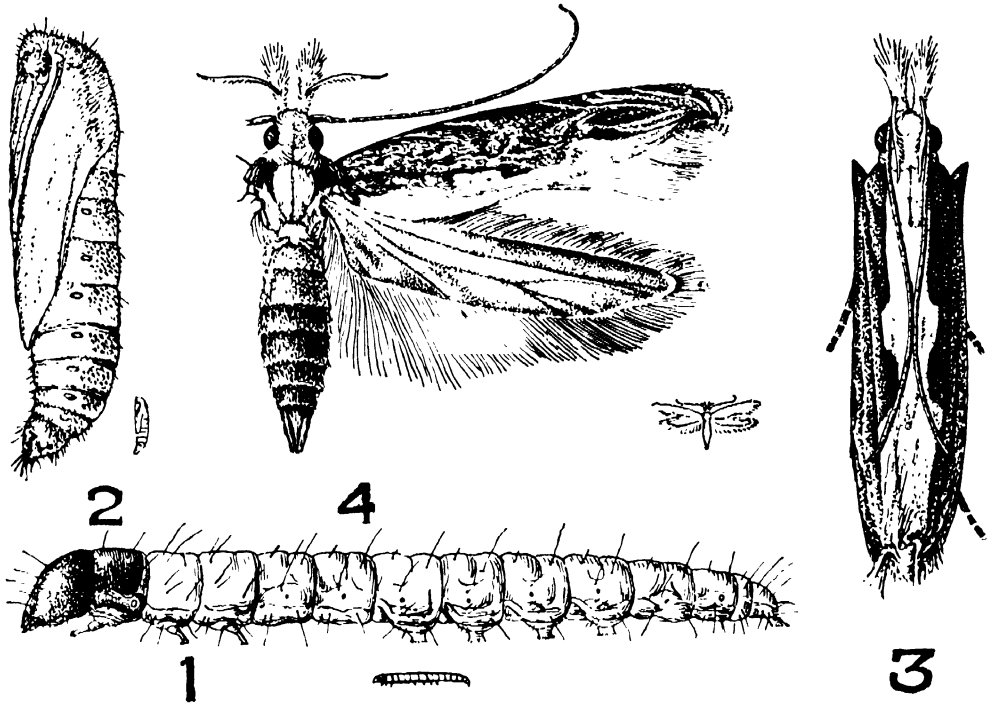
*Chelaria spathota*, Fletcher, Ind. Agric. Ent. Mem. VI. 95 (1921).

This has also been reared at Pusa from larvæ folding very tender leaves of *Odina wodier* in July and August 1922 and in August 1924. The larva folds the two edges of a leaf over the midrib so as to form a sort of pouch within which it lives and feeds, nibbling the surface of the leaf. The full-grown larva is about 11 mm. long and 1 mm. broad, cylindrical, moderately stout, tapering slightly posteriorly ; head black, dull, rather square in shape, as broad as prothorax ; prothoracic plate well developed, chitinated, extending over whole segment to spiracles, black, with a fine median yellowish line ; prothorax crimson, with a narrow black linear patch before and below spiracle ; other segments pale yellow, with fine short hairs which on dorsum are arranged trapezoidally ; prothoracic legs pale grey ; mesothoracic and metathoracic legs creamy-yellowish, glossy ; prolegs short, cylindrical, shining creamy-yellowish with incomplete rings of hooklets on oval soles ; spiracles minute, circular, with clear centres and black rims. Before pupation, the general colour becomes pink. No description of the pupa was made. The pupal period in July-August is seven to nine days. (Pusa Insectary Cage-slip No. 2291.)

*H. spathota* also occurs in Tonkin.

The other species, quoted under *Chelaria* in Ent. Mem. VI, 94-95 (*phacelota*, *rhicnota* and *scopulosa*) should also be referred to *Hypatima*, Hb. 1826=*Chelaria*, Hw. 1828, Meyrick.

HYPATIMA SPATHOTA, MEYRICK.



1. Larva  $\times 8$ .
2. Pupa  $\times 8$ .
3. Moth, resting posture  $\times 8$ .
4. Moth  $\times 8$ .

(Small figures show natural sizes.)





## HYPATIMA STICTOCOSMA, MEYRICK.

*Chelaria stictocosma*, Meyr., Exot. Micr. II, 303 (1920)<sup>1</sup>; Meyr., Exot. Micr. IV, 71 (1931)<sup>2</sup>.

*Chelaria levata*, Meyr., Exot. Micr. II, 304 (1920)<sup>3</sup>.

This species is known from Coorg<sup>1</sup>, Dharwar<sup>1</sup> and Pusa<sup>2, 3</sup>. It has been bred at Pusa in August from larva feeding on *Desmodium gangeticum* (Leguminosæ)<sup>2</sup>.

## HYPATIMA TAPHRONOMA, MEYRICK.

*Chelaria taphronoma*, Meyr. M. 8.

Larvæ were found in August and September 1930 at Pusa feeding on leaves of *Abrus precatorius* binding together two or three or four leaflets and feeding on the entire tissue. The larva is about 5.5 mm. long and 0.75 mm. broad, almost uniformly cylindrical, tapering very slightly posteriorly; head shining, black; prothoracic shield large, covering the whole segment, shiny, black, ventral surface of prothoracic segment pinkish-purple; first pair of legs black, the other two pairs creamy-yellowish; segments with fine, small, single hairs, arising from minute black tubercles, arranged rectangularly on dorsal surface of first seven abdominal segments; prolegs five, short, cylindrical, glassy whitish with brown hooklets in complete circles; spiracles small, rounded, with black rims and clear centres, that on eighth segment larger and oval.

Pupa about 3.5 mm. long and 0.8 mm. broad, cylindrical, posterior half of abdomen incurved; yellowish-brown; spiracles small, round, with dark brown rims; wing cases reaching to end of fifth abdominal segment; eighth, ninth and tenth abdominal segments not clearly defined; a few fine hooked cremastral hairs on anal segment; all segments with very minute hairs. Moths emerged at the end of September and beginning of October. (Pusa Insectary Cage-slip 2558.)

## BUCOLARCHA GEODES, MEYRICK.

*Bucolarcha geodes*, Meyr., Exot. Micr. III, 515 (1929)<sup>1</sup>.

Described from Pusa and from Dibidi<sup>1</sup> (Coorg; 3,500 ft.), in India, and from Weenen, in Natal<sup>1</sup>. At Pusa it was bred in July from larva feeding in pod of *Acacia catechu*<sup>1</sup>. Mr. Meyrick says that "probably the species is native in India, and has been introduced into Africa with its foodplant."<sup>1</sup>

## DACTYLETHRA CANDIDA, STAINTON.

(Entl. Mem. VI. 84.)

This has also been reared by T. V. Ramakrishna Ayyar on 12th May 1920 from larva in *kolingi* pods at Negapatam.

## BRACHYACMA PALPIGERA, WALSINGHAM.

*Paraspistes palpiger*a, Fletcher, Ind. Agric. Ent. Mem. VI, 88 (1920)<sup>1</sup>.

*Lathontogenus adustipennis*, Wlsm., P. Z. S. 1897, 88 (1897)<sup>2</sup>

*Brachyacma epichorda*, Turner, Proc. R. Soc. Queensl. XXXI, 163-164 (1919)<sup>3</sup>.

*Lathontogenus palpiger*a, Bottimer, Jl. Agric. Res. XXXIII, 812 (1926)<sup>4</sup>.

*Brachymacma palpiger*a, Leonard and Miles, Jl. Ec. Ent. XXIV, 472-473 (1931)<sup>5</sup>.

This species also occurs in Texas,<sup>4</sup> Central and South America, Porto Rico,<sup>5</sup> Tonkin and Queensland.<sup>3</sup> It is now placed in the genus *Brachyacma*, Meyrick 1886, of which *Lathontogenus*, Wlsm. 1897, *Paraspistes*, Meyr. 1905, and *Lipatia*, Busck 1910, are synonyms.

It was reared at Pusa on 17th December 1927 from a larva feeding on seeds of *Parkinsonia aculeata*. It also occurs at Port Blair, Andamans.

In Texas it has occurred in pods of *Vachellia farnesiana*<sup>4</sup> and in Porto Rico in dry pods of pigeon pea<sup>5</sup>.

## DICHOMERIS ERIDANTIS, MEYRICK (PLATE XXXIV).

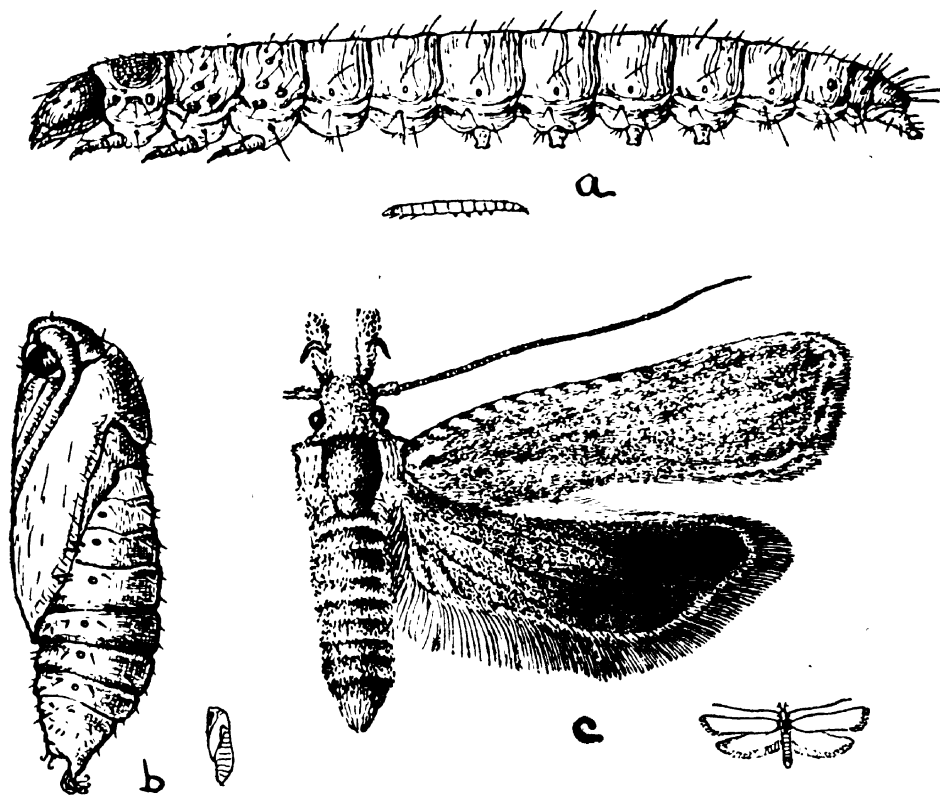
*Dichomeris eridantis* [lapsus], Fletcher, Entl. Mem. VI. 91 (1920).

This species was found in 1928 in sufficient numbers to constitute it a pest of *Dalbergia sissoo* in the plantations of Changa Manga, Chichawatni and Khanewal, continuous breeding taking place from April to September (Forest Entomologist). It also occurred on *Sissoo* leaves at Pusa in some numbers in 1928 and was also reared at Pusa in 1927, 1929, and 1930.

The larva binds together two leaves of *Dalbergia sissoo* and feeds on them. The full-grown larva is about 16 mm. long and 2 mm. broad, subcylindrical, moderately stout, slightly tapering posteriorly; head rather glossy, flattened, brown speckled with black; prothoracic shield not covering whole segment, brown, with a fine rather indistinct median line and tinged with blackish on posterior and lateral margins; mesothorax sometimes with a blackish band; general colour brownish-yellow, with a pinkish mid-dorsal stripe, and sometimes with a blackish stripe below trapezoidal warts, which are small, round, black; spiracles with clear centres and black rims; legs blackish; prolegs pale yellow.

Pupation takes place in a slight cocoon amongst rolled leaves. The pupa is about 9-10 mm. long by about 2.5 mm. broad, brown; on each side of mid-dorsal line about half of the hind margin of the first three abdominal segments bears a black, horny, concave patch, and the contiguous region of the succeeding segments is swollen and clothed with brown hairs; anal segment with a black pointed process provided with cremastral hairs which remain entangled in the fibres of the cocoon. The pupal period is seven to ten days about the end of March. (Pusa Insectary Cage-slips No. 995 repeated and 2017.)

DICHOMERIS ERIDANTIS, MEYRICK.



- a. Larva  $\times 6$ .
- b. Pupa  $\times 6$ .
- c. Moth  $\times 6$ .

(The smaller figures show the natural sizes).



## DICHOMERIS IANTHES, MEYRICK.

(Entl. Mem. VI. 89-91, t. 21.)

Also found in British East Africa and Mauritius, and in the Malay Peninsula, where it has been reared from larvæ on indigo, *Tephrosia candida*, *T. purpurea*, *Desmodium gyroides*, *Sesbania sericca*, and *Tephrosia vogelii* (Corbett and Gates, Dept. Agric. F.M.S., Bull 38, p. 8 : 1926). We have still no exact record from Burma, but it is almost certain to occur there also.

It was also bred at Pusa from larvæ rolling *bersem* leaves from November 1927 to March 1928.

## DICHOMERIS QUERCICOLA, MEYRICK.

*Dichomeris quercicola*, Mey., Exot. Micr. II, 433 (1921)<sup>1</sup>.

Described from a single female bred in August from larva on *Quercus* in Kangra (Beeson)<sup>1</sup>.

## CARBATINA PICROCARPA, MEYRICK.

*Carbatina picrocarpa*, Meyr., B. J. XXII 182 (1913)<sup>1</sup>.

This was described from Japan, where I collected the first specimen at Hakodate<sup>1</sup> over thirty years ago, and from the Khasi Hills in Assam. It also occurs in China. Mr. Meyrick informs me (*in litt.*) that the larva is a leaf-roller on peach, this information being given on the authority of Mr. Busck.

## CYMOTRICHIA ANTISTICTA, MEYRICK.

*Cymotricha antisticta*, Meyr., Exot. Micr. III, 511-512 (1929)<sup>1</sup>.

Bred at Dharwar in June from a larva feeding in May amongst spun-together youngest leaves at end of shoot of *Terminalia tomentosa* (Combretaceæ), pupating in same position. (Maxwell.)<sup>1</sup>

## CYMOTRICHIA CYMATODES, MEYRICK.

*Trichotaphe cymatodes*, Meyr., Exot. Micr. I, 584 (1916)<sup>1</sup>.

*Cymotricha cymatodes*, Meyr., Wyts. Gen. Ins., fasc. 184, p. 183 (1926)<sup>2</sup>;  
de Joannis, Ann. Soc. Ent. France XCIX, 726 (1931)<sup>3</sup>.

This species is known from Assam and Tonkin, where the larva has been found on *Stillingia sebifera*.<sup>3</sup>

## CYMOTRICHIA GEOCHROTA, MEYRICK.

*Trichotaphe geochrota*, Fletcher, Ind. Agric. Ent. Mem. VI, 89 (1921).

This species is now placed in the genus *Cymotricha*.

## CYMOTRICA PSEUDOMETRA, MEYRICK.

*Trichotaphe pseudometra*, Meyr., B. J. XXII, 178-179 (1913)<sup>1</sup>; Fletcher, Ind. Agric. Ent. Mem. VI, 204 (1921)<sup>2</sup>.

This species is now placed in the genus *Cymotricha*. It also occurs in the Andamans (Mt. Harriet : 1,200 ft.).

## MACROCERAS (ÆCOPHILA), STAUDINGER.

*Oecia* [*Æcia*, error typogr.] *æcophila*, Fletcher, Ind. Agric. Ent. Mem. VI, 95 (1921)<sup>1</sup>.

*Oecia acophila*, Meyr., Wyts. Gen. Ins., fasc. 184, p. 198, t. 5 f. 109 (1926)<sup>2</sup>.

This species has also been found at Rangoon and Shillong and in Coorg (Dibidi; 3,500 feet). In the Malay Peninsula it has been reared by Corbett and Gates from paper and from rat's dung (*Dept. Agric. F.M.S., Bull.* 38, p. 8 : 1926). It also occurs in Egypt, where it has been recorded from Cairo by Rebel (*Bull. S. E. Egypte* 1926, p. 189; 1927) and from Alexandria, where the larvæ were found to be doing damage by burrowing in plastered walls of houses (Alfieri, *Bull. Soc. Ent. Egypte* (n. s.) XII 1-4, t. 1 : 1929).

## HELIANGARA MACARITIS, MEYRICK.

*Heliangara macaritis*, Meyr., Rec. Ind. Mus. V, 221 (1910)<sup>1</sup>; Meyr., Wytsm.

Gen. Ins., fasc. 184, p. 216 (1926)<sup>2</sup>; Meyr., Exot. Micr. IV, 76 (1931)<sup>3</sup>.

This pretty little species was originally described from Goalbathan (E. Bengal)<sup>1</sup> and the Konkan<sup>1</sup>. I have taken it at light at Pusa and Sadiya (Assam), but nothing was known of its life-history until it was bred recently at the Forest Research Institute, Dehra Dun, from larvæ feeding on rotten stems of *Jatropha curcas* (Euphorbiaceæ)<sup>3</sup>.

## HYGROPLASTA SPOLIATELLA, WALKER.

*Gelechia spoliatella*, Wlk., Cat. XXIX, 659, (1864)<sup>1</sup>.

*Zalithia diluticornis*, Wlsm.; Fletcher, Ind. Agric. Ent. Mem. VI, 83-84 (1921)<sup>2</sup>

The name previously given requires to be changed, Walker's specific name having precedence and the species being now placed in the genus *Hygroplasta*, Meyrick 1926. This species also occurs in N. Kanara.

## PHILARACHNIS XEROPHAGA, MEYRICK.

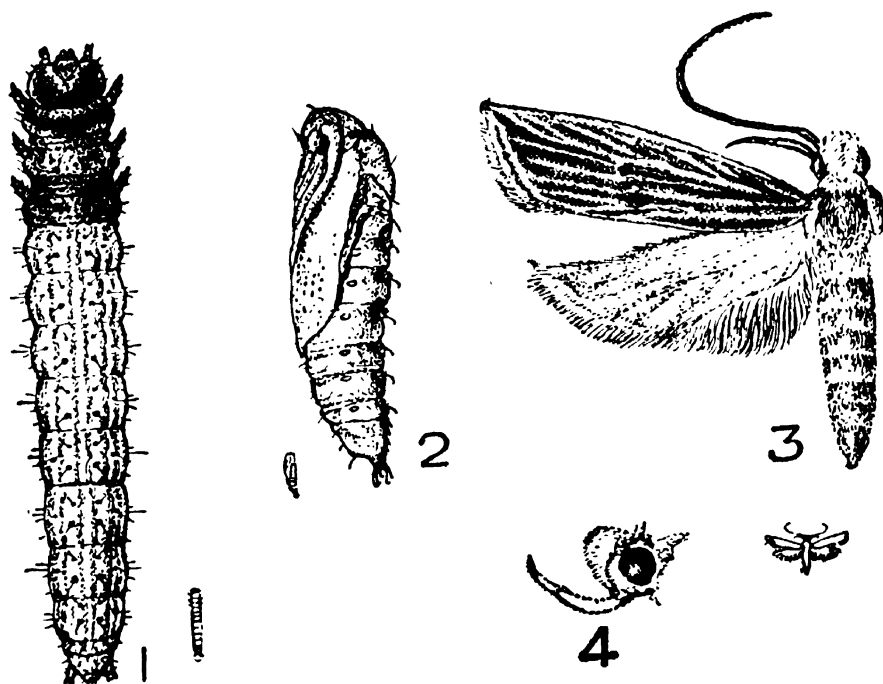
(*Entl. Mem.* VI, 86-87, t. 20, f. 1.)

This species has now been removed from *Brachmia* and has been placed in the genus *Philarachnis*, Meyrick 1926.





BRACHMIA AROTRAEA, MEYRICK.



1. Larva dorsal view  $\times 9$ .
2. Pupa lateral view  $\times 9$ .
3. Moth  $\times 9$ .
4. Head of moth  $\times 9$ .

(The smaller figures show the natural size).

## BRACHMIA AROTREA, MEYRICK (PLATE XXXV).

(Entl. Mem. VI, 85.)

Larvæ were found at Pusa on 6th September 1928 on Rice (*Oryza sativa*), rolling the leaves longitudinally and feeding on the green tissue, leaving the leaf skeletonized. The larva is about 9 mm. long and 1.25 mm. broad, cylindrical, tapering very slightly posteriorly; head glossy, black-brown, clypeal triangle yellowish-brown; prothoracic shield shiny, black, chitinized; mesothorax greenish dorsally, black laterally; metathorax velvety-black; legs shining, black, well-developed; general colour of body light green with dorsal and two lateral black lines; anterior trapezoidal hairs shorter than posterior; prolegs short, rodlike, glassy-white, with incomplete circles of hooklets; spiracles minute, rounded, with clear centres and black rims.

Pupation takes place in a thin transparent cocoon within the rolled leaf. The pupa is about 5 mm. long and 1.25 mm. broad; wing-cases reaching anterior margin of fourth abdominal segment; colour yellowish-brown, glossy; spiracles oval, with brown rims; anal segment blackish-brown with a few cremastral hairs; fine single hairs on other segments. (Pusa Insectary Cage-slip No. 2405.)

*B. arotrea* also occurs in Assam (Dibrugarh and Jhajhi).

## BRACHMIA CONVULVULI, WALSINGHAM.

*Trichotaphe convolvuli*, Wlsm., P. Z. S. 1907, 944, t. 51, f. 16 (1908)<sup>1</sup>.

*Brachmia convolvuli*, Meyr., T. E. S. 1923, 547 (1924)<sup>2</sup>; Meyr., Wyts. Gen. Ins., fasc. 184, p. 249 (1926)<sup>3</sup>.

*Brachmia crypsilychna*, Meyr., B. J. XXII, 773-774 (1914)<sup>4</sup>.

*Lecithocera crypsilychna*, Meyr., Exot. Micr. II, 103 (1918)<sup>5</sup>; Fletcher, Ind. Agric. Ent. Mem. VI, 84 (1921)<sup>6</sup>.

*Lecithocera effera*, Meyr., Exot. Micr. II, 104 (1918)<sup>7</sup>; Fletcher, Ind. Agric. Ent. Mem. VI, 84-85, 202-203, t. 62, f. 2 (1921)<sup>8</sup>.

*Brachmia effera*, Fletcher, Rept. Third Ent. Meeting, I, 154 (1920)<sup>9</sup>.

*Brachmia dryadopa*, Meyr., Ann. Transv. Mus. VI, 25 (1918)<sup>10</sup>.

*Brachmia convolvuli*, Meyr., T.E.S., LXXVIII 313 (1930)<sup>11</sup>.

*Brachmia convolvuli* was originally described from the Canary Islands<sup>1</sup>, *crypsilychna* from Bassein Fort (Bombay)<sup>4</sup>, *effera* from Surat<sup>7</sup>, *dryadopa* from Natal<sup>10</sup> and the Comoro Islands.<sup>10</sup> In 1926<sup>3</sup> Mr. Meyrick sunk these under *convolvuli*, and in 1930<sup>11</sup> gave the distribution of *convolvuli* as S. Africa, Comoro Islands, Mauritius, Canary Islands, and the Indo-Malayan Region.

The first description of the larva of *crypsilychna* was previously omitted by oversight and reads: tapering much posteriorly and slightly anteriorly, black; collar banded with white; plate of 2 smoky-black with a triangular brownish yellow space; second and third interstices creamy-white, next three dull brown; 7, 8

and 10-12 with V-shaped creamy marks ; between spun leaves of *Ipomœa arvensis* (Convolvulaceæ)<sup>4</sup>.

Lord Walsingham's description of the larva of *convolvuli* is as follows :—" Bred from larvæ reminding one much of those of *Brachmia rufescens*, Hw., in their black and white oblique striping. Head honey-yellowish, edged with blackish ; pronotal plate honey-yellow, posteriorly broadly black-margined lunately, suture honey-yellow ; mesothorax, metathorax and abdominal somites I-II blackish, mesothorax conspicuously separated by white from the metathorax and prothorax, the latter similarly separated from the head ; abdominal somites III-IX white, with blackish markings—the lateral markings are oblique, as in *rufescens*, but having no pale dorsal stripe to interrupt them, anteriorly above, they form on each segment a complete arcuate band, followed on somites III-VII by a transverse bar of the same colour, but on V this bar is not apparent, owing to dark dorsal suffusion ; normal spots distinct, black ; legs black, abdominal claspers tipped with blackish ; long 15 mm. The larvæ roll the leaves of *Ipomœa quinquefolia* in January, and are extremely abundant on this introduced plant at Santa Cruz, especially on a wall below the Quisisana Hotel."<sup>1</sup>

Larvæ, which produced moths identical with co-types of *Brachmia crypsilychna*, Meyr., were found at Pusa at the end of June and beginning of July 1923 on *Ipomœa turpethum*, rolling a portion of a leaf or joining two edges of a leaf with fine silken strands so that the edges are joined together above the midrib, and feeding within this shelter by nibbling the upper surface of the leaf in irregular patches, leaving the lower epidermis untouched ; the larval frass collects inside this fold, which may contain one or two larvæ. The full-grown larva is about 16 mm. long and 2 mm. broad, cylindrical, tapering slightly towards either extremity ; head small, equal in size to prothorax, black, rather glossy, with a few fine brown hairs ; prothoracic shield chitinated, black, not quite reaching anterior yellow margin of segment which is edged with white ; incisions between thoracic segments marked in white ; legs black ; general colour of mesothorax, metathorax and abdominal segments dull velvety black ; segments distinct, with single black hairs ; third to eighth abdominal segments with white, slightly greenish-tinged, oblique bands, of which the first runs from base of first pair of prolegs to anterior lateral margin of third abdominal segment, the second runs from base of second pair of prolegs to middle of dorsum of third abdominal segment, the third runs parallel to second from base of third proleg, the fourth runs from base of fourth proleg to anterior lateral margin of sixth abdominal segment ; seventh and eighth segments with oblique white lateral band reaching to sixth and seventh segments ; eighth abdominal segment with narrow white posterior margin ; anal plate whitish, with a fringe of fine single hairs ; prolegs short, rod-like, pale-yellowish, shiny, with black longitudinal markings anteriorly and posteriorly, and with brown hooklets arranged in incomplete circles, a small outer portion being unarmed ; anal claspers black dorsally and pinkish distally ; spiracles very minute, circular, with blackish rims.

Pupation takes place within a rolled or folded leaf, wherein a small patch of white silken threads is placed to hold the pupa in position by means of the cremastral hooks. The pupa is about 8 mm. long and 1.75 mm. broad, cylindrical, yellowish-brown, glossy; first three abdominal segments with a mid-dorsal black roughened notch-like process which fits into the anterior margin of the succeeding segment; anal segment with a short cremastral process, armed with a small group of hooked hairs; spiracles rounded, small, with narrow brown rims. (Pusa Insectary Cage-slip No. 2262.)

BRACHMIA INSULSA, MEYRICK.

(Entl. Mem. VI, 86.)

This has been bred at Pusa in May 1918 from larvæ found at base of *juar* shoots, and a larva was also found at Pusa on 27th July 1927 feeding on dry sugarcane leaf-sheaths at the base of the stem.

*B. insulsa* is probably widely distributed in the Plains of Northern India. It was common at light at Dehra Dun on 6th-7th July 1929.

BRACHMIA PHILOMUSA, MEYRICK.

*Brachmia philomusa*, Meyr., Exot. Micr. II, 114-115 (1918)<sup>1</sup>; Meyr., Exot. Micr. III, 527 (1929)<sup>2</sup>.

Described from Chapra<sup>1</sup> (North Bihar), and from Puttalam<sup>1</sup> and Galle<sup>1</sup>, in Ceylon. Larva mining or rolling leaves of *Vernonia cinerea* (Compositæ)<sup>2</sup>. This latter record was made at Pusa, although it is not so stated.

Larvæ were found at Pusa in December 1921 and in January and July 1922 and in December 1930 on leaves of *Vernonia cinerea*. When very young, the larva mines in a leaf, feeding on the green tissue between the two surfaces, and making a hole through which the frass is extruded and which also serves as a hole of exit for the larva when, at a later stage, it leaves the mine and begins to roll a leaf, feeding on the green tissue of the upper surface and leaving the lower epidermis intact but greenish-yellow in colour. The full-grown larva is about 7.9 mm. long and 1.1-1.75 mm. broad, cylindrical, tapering very slightly posteriorly; head slightly smaller than prothorax, shining, light brown in middle, blackish on cheeks, sides and base; prothorax smaller than succeeding segments, with a chitinized shield anteriorly narrowly whitish or light yellowish and posteriorly blackish with a fine median line; mesothorax, metathorax and abdominal segments dark pinkish-purple; mesothorax and metathorax with narrow whitish band anteriorly; third to ninth abdominal segments with an oblique reddish-purple band from base of proleg (where present) to anterior dorsal margin of segment, each band followed by whitish area, so that posterior half of each segment is whitish dorsally; ventral surface of third abdominal and succeeding segments pale yellowish; very minute fine hairs arising singly from

warts on segments; legs shining, black, with distinct segments; prolegs slender, rod-like, glassy-white, with a small black basal marking; spiracles minute, oval, with pale yellowish centres and dark brown or blackish rims. In young larvæ the purplish colour is replaced by light yellowish-brown.

Pupation takes place in a rolled leaf of the foodplant. (No description of the pupa was made.) The pupal period varies from about five days in July to about three weeks in January. (Pusa Insectary Cage-slips Nos. 2203, 2582.)

#### BRACHMIA VECORS, MEYRICK.

*Brachmia vecors*, Meyr., Exot. Micr. II, 112 (1918)<sup>1</sup>; de Joannis, Ann. Soc. Ent. France, XCIX, 727 (1931)<sup>2</sup>.

*B. vecors* is known from South India, Tonkin and China. In Tonkin the larva is recorded as living "dans les gousses [pods] de flamboyant,"<sup>2</sup> by which perhaps *Poinciana regia* is intended.

















